May, 1977 Technical Bulletin No. 239

Taxonomic Study of the Cicadellinae (Homoptera: Cicadellidae) Part 2. New World Cicadellini and the Genus *Cicadella*

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Taxonomic Study of the Cicadellinae (Homoptera: Cicadellidae) Part 2. New World Cicadellini and the Genus *Cicadella*

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Introduction

Part 1 of this work (Young, 1968a) included all of the tribe Proconiini, which is limited to the Western Hemisphere. My original plan was to include all of the tribe Cicadellini in one publication, but the size of the group is much greater than anticipated, partly because of the collecting activities in New Guinea sponsored by the Bishop Museum. As a result, it was decided to publish the tribe Cicadellini in two parts, one for each hemisphere. The grouping is convenient, because my work, until now, indicates that the Old World genera stand apart, except for a group of genera in both hemispheres related to the type-genus, *Cicadella* Latreille. *Cicadella*, the only genus in Europe, is treated here because it is close to *Chlorogonalia,* new genus, and to genera related to the latter. The other related Old World genera will be readily associated, through *Cicadella*, and the disadvantages of the separate published parts will be ameliorated to a large extent.

A study of one year in Europe in 1962-1963 enabled me to study most of the types of Cicadellinae in the museums of Germany, Austria, Czechoslovakia, Hungary, Poland, Denmark, Sweden, France, and England. I designated lectotypes in a series of papers, with plans to illustrate diagnostic characters in the present classification. A number of these were published in Part 1; many others are included here. In very many cases, the characters had been illustrated from specimens studied beforehand, and the lectotypes compared with the illustrations. Where problems of species identity still exist, these are noted in the text, or in the lists of species. Species of uncertain position or of unknown identity are listed at the end of this part. It should be noted that I did not study the collections of Germar, nor of Spinola, but the Zoologische Institut und Museum in Hamburg has many specimens from the Germar collection, which were studied, and I was given photographs of some of the Spinola species by Carlo Vidano (see acknowledgments). Most of the museums I visited sent their undetermined specimens to be studied and included in this reclassification, although I had only a small part of the large collection in Museum national d'Histoire naturelle in Paris, and very little of the undetermined material from the good collection in Polska Academia Nauk in Warsaw.

As in Part 1, I did not deal completely in Part 2 with genera recently revised, and there are some genera where characters were not found to separate nominal species.

Where lectotypes are selected in Part 2, labels on the specimens are quoted line for line, with each line separated by a virgule or slash (/), and the individual labels separated by the word "and".

As in Part 1, codes for bibliographic references are used in Part 2 wherever possible. These consist of the author's name, a date and letter, and a page number. The code citations refer to Metcalf's "General Catalogue of the Homoptera", Fascicle VI (see Literature Cited), and "Cicadelloidea: Bibliography of the Cicadelloidea (Homoptera: Auchenorhyncha)" published in March, 1964 by the Agricultural Research Service, U. S. Department of Agriculture. The code

numbers in that Catalogue are the same as, but more inclusive than, Metcalf's "Bibliography of the Homoptera Auchenorhyncha", vol. 1 (1942), published in 1944, by the North Carolina State College of Agriculture and Engineering, University of North Carolina. The terminal bibliography of the present paper includes only those papers not included in the 1964 bibliography.

Unless stated otherwise, all the new names and names of new taxa proposed here are arbitrary combinations of letters. For the new genera, it is intended that the nominal species selected as type-species be accepted, unless stated otherwise.

Because of limitations of space and time, no record was kept of the institutional source of all the specimens examined. Also for want of time, misidentifications in the literature have not been corrected. Many of the localities reported heretofore for some of the species are based on misidentifications. The geographic range indicated in the lists of species include only those localities from which I have seen accurately identified specimens, with rare exceptions that are explained, or indicated by brackets. It should be noted that discrepancies between the ranges given for new species in their descriptions and in the list of species occur occasionally. This resulted from the identification of additional specimens of the respective species after the description was written — in some cases after a lapse of several years.

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Dr. James W. Hardin of North Carolina State University assisted by editing the scientific names and their authors for the plant species mentioned here. Dr. Paul Freytag, of the University of Kentucky was instrumental in sorting specimens, useful in this work, from the California Academy of Sciences and the American Museum of Natural History.

Once more, I am grateful to my wife, Irene, for her patience and encouragement during the years this work was in progress.

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The alphabetical list of symbols below are those used above, and later in this work in referring to the respective institutions.

AMNH	American Museum of Natural History (Dr. Jerome Rozen and Dr. P. Wygodzinsky).
BM	British Museum (Natural History) (Dr. W. E. China, Mr. R. J. Izzard, Dr. W. J. Knight).
BPBM	Bernice P. Bishop Museum, Hawaii (Dr. J. Linsley Gressit).
CAS	California Academy of Sciences (Dr. P. Arnaud and Dr. E. S. Ross).
CM	Carnegie Museum, Pittsburgh (Dr. George Wallace).
CNC	Canadian National Collection, Ottawa (Dr. Leonard A. Kelton).
DEI	Deutsches Entomologisches Institut, East Berlin (Dr. Günther Peterson).
FM	Field Museum of Natural History, Chicago.
HNHM	Magyar Nemzeti Múseum, Budapest (Hungarian Natural History Museum, Dr. Árpad Soós).
HS	Martin Luther Universität, Halle, Wittenberg, East Germany (Dr. J. O. Hüsing).
HU	Institut für Spezielle Zoologie and Zoologisches Museum der Humboldt-Universität, East Berlin (Dr. U. Göllner and Dr. K. K. Günther).
IML	Instituto Miguel Lillo, Tucumán, Argentina, (Dr. A. Willink).
IRB	Institute Royal des Sciences Naturelles, Brussels (Dr. H. J. Synave).
IRSM	Institut de Recherches Scientifiques à Madagascar (Dr. P. Malzy).
IZP	Polska Akademia Nauk, Instytut Zoologiczny, Warsaw (Dr. Janusz Nast).
KSU	Kansas State University, Manhattan, Kansas (Dr. H. Derrick Blocker).
KU	University of Kansas, Lawrence (Dr. George W. Byers).
MCZ	Museum of Comparative Zoology, Harvard College (Dr. P. J. Darlington).
MHNP	Museum national d'Histoire naturelle, Paris (M. Roland Bénard).
MMB	Moravské Museum, Brno Czechoslovakia (Mr. P. Lauterer, Dr. Jaroslav Stehlík).
NCS	North Carolina State University at Raleigh.
NMV	Naturhistorisches Museum, Vienna (Dr. Max Beier and Dr. A. Kaltenbach).
OSU	Ohio State University, Columbus (Dr. C. Triplehorn and Dr. D. M. DeLong).
RD	Mr. Robert Dreisbach, Midland, Michigan.
RFC	Rockefeller Foundation, Medellín, Colombia (Dr. Robert F. Ruppel).
RFM	Rockefeller Foundation, Mexico, D. F., Mexico (Dr. Douglas Barnes).
RMS	Naturhistoriska Riksmuseet, Stockholm (Dr. Lars Brundin, Dr. Erik Kjellander and Dr. Inge Persson).
SMT	Staatliches Museum für Tierkunde, Dresden (Dr. Rolf Hertel).
SNGF	Natur-Museum und Forschungs-Institut Senckenberg, Frankfurt-am-Main (Dr. Heinz Schröder).
SPBF	State Plant Board of Florida, Gainesville (Dr. Frank W. Mead).
SSM	Zoologische Sammlung des Bayerischen Staats, Munich (Dr. Walter Forster, Dr. Heinz Freude).
ULP	Universidad Nacional de La Plata, Argentina (Dr. Luis de Santis and Dr. A. Belindo Torres).
USNM	United State National Museum, Washington (Dr. J. P. Kramer).

UCAL University of California, Berkeley (Dr. Jerry Powell).
ZIL Zoological Institute, University of Lund, Sweden (Dr. C. H. Lindroth).
ZIMH Zoologisches Institut und Museum, Hamburg (Dr. Wilhelm Wagner, Dr. Herbert Weidner).

Additional acknowledgment of assistance received is made in appropriate places in the text below.

Morphology

The total length of the specimens, in the descriptions below, is measured from the apex of the crown of the head to the apices of the forewings at rest. The median length of the crown is measured from the apex of the crown to the posterior margin of the crown. The interocular width is the least width between the compound eyes. The ocelli may be in line with the anterior eye angles, in dorsal view, or before a line drawn between the anterior angles, or behind such a line. An ocellus may be located equidistant from the adjacent anterior eye angle and the median line of the crown, or closer to the eye angle than to the median line, or closer to the latter. The contour of the surface of the crown is a useful character. It may be entirely convex, or may bear a longitudinal or a transverse (best seen in lateral and slightly dorsal view) concavity. The crown is rarely concave. The occurrence of setae on the crown is often useful as a character. The texture of the crown may be glabrous, smooth, granular, punctate, pitted, rugulose, or rugose (observations made with stereoscopic microscope at no more than × 64). The occurrence of elongate pits or depressions on the crown has been found to be a useful character for separating certain groups of genera in the key. The lateral clypeal sutures extend up onto the crown to or near the ocelli in most of the Cicadellinae, and this is a useful character at subfamily level. But they fail to extend onto the crown in most species of *Mesogonia*, a genus that is sufficiently close to *Juliaca* to warrant retaining it in Cicadellini. The presence or absence of an angle or carina at the transition from crown to face is useful in classifying genera.

In a few genera of Cicadellini, the antennal ledges are protuberant, in dorsal view, but never to the extent found usually in the Proconiini. The anterior margin of an antennal ledge, in lateral view, may be vertical or oblique; in either case it may be convex or rectilinear. The arcuate impressions of the dilator muscles of the cibarium, in a vertical row on each side of the clypeus, may be distinct or not. The surface texture of the portion of the clypeus between the muscle impressions is often useful. A transclypeal suture separates the clypeus from the clypellus, but it is frequently obscure medially. The clypellar profile is often a continuation of the curvature of the clypeus, but frequently its lower portion is more nearly horizontal, more nearly parallel to the venter.

The thorax has several useful characters: its greatest width compared with the transocular width of the head, the shape of the lateral margins in dorsal view (parallel, convergent anteriorly, divergent anteriorly), the sculpturing and pubescence of the disk, the shape of the posterior margin, and the texture of the scutellum. The dorsopleural carina of the prothorax is usually complete (extending to the eye margin) in Western Hemisphere Cicadellini, but it may be absent (e.g. *Draeculacephala*) or incomplete (not attaining the eye margin). As in some

Proconiini, some Cicadellini have the posterior meron exposed when the forewings are at rest (Young 1968a:11).

The posterior legs have several useful characters. The knees, at rest, extend forward as far as the posterior margins of the proepimera in most genera, but some genera are variable with regard to this character. All of the variations in the posterior femoral setal formula described and illustrated in Part 1 of this work (Young, *loc. cit.*) are found in the Cicadellini: 2:0:0 (a pair of large setae near femoral apex, none more proximally), 2:1:0 (a pair of large setae near femoral apex, one more proximally), 2:1:1 (a pair of large setae near femoral apex, two in a file more proximally); or 2:1:1:1 (as the last preceding but with three large setae in the file). The posterior tibiae are almost always flattened more than in the Proconiini. The length of the first tarsomere compared to the combined length of the two succeeding tarsomeres of the posterior leg is a useful character. The measurements were taken at a right angle to the long axis of the tarsus from a lateral view, and the greatest length of the first tarsomere compared with the greatest combined length of the succeeding two (ventral margin of first tarsomere vs. dorsal margin of second plus third). The "plantar surface" of the tarsus is in contact with the substrate when the insect is at rest.

Of the forewing, useful characters include the presence or absence of a membrane and its extent when present, whether or not the veins are elevated or distinct, the number of anteapical cells and the locations of their bases, whether or not one or more of the anteapical cells is/are open basally, the number of apical cells and their relative lengths, the sculpturing and texture of the wing surface, the presence or absence of supernumerary crossveins, and the shape of the apical wing margin. The commissural margin is the mesal margin of the forewing in rest position. Apical cells are numbered in sequence beginning at the commissural margin when the forewing is at rest. The brachial cell is that cell of the corium which is adjacent to the claval suture.

Several characters of the hindwing are useful in classification and are described and illustrated in appropriate portions of the text.

The male genitalia consist of structures of abdominal segment IX. The genital capsule consists of a large ninth tergum or pygofer, in the form of an inverted U, a narrow transverse sternum, a pair of male plates extending posteriorly from the apical margin of the sternum, and an extensive membrane extending between the lower edges of the tergum and closing the capsule posteriorly. The pygofer varies from strongly produced posteriorly to weakly so.

The pygofer is usually described in lateral view in this work, although occasionally from an additional view, also. Hence paired structures, e.g. processes occurring one on each side, are described in the singular, and the chaetotaxy of only one side is described. The posterior margin of the pygofer varies from acute through narrowly rounded to broadly convex, or truncate, or concave, or deeply emarginate. Processes vary between genera and interspecifically as to their point of origin, their form, and as to the direction in which they extend. Two sorts of setae occur on the pygofer, those that appear to have some breadth at the magnifications used (up to × 64), referred to as macrosetae; and those that are linear, the microsetae. Except in some cases where the number of setae is very

small, I have not found the number to be constant, and the illustrations are not precise in this respect.

The form of the male plates, and their chaetotaxy is often useful taxonomically. The descriptions do not include all the microsetae present on the plates unless the latter are important in classification.

The taxonomically important so-called "internal" genitalia of the males consist of a pair of symmetrical styles; a structure extending between them near their bases, the connective; an intromittent organ, the aedeagus; and in some species one or a pair of accessory structures, the paraphyses, arising between the apex of the connective and the base of the aedeagus. The "shank" of the style extends from its articulation with the connective to the style apex. The form of the styles and their extent relative to the apex of the connective are useful characters. Only one style of the symmetrical pair is described hereinafter.

The form of the connective is constant within taxa. Most often it is Y-shaped, with the stem of the "Y" almost always bearing a keel in the species included here. It has been considered a basal sclerite of the aedeagus by morphologists.

The paraphyses may be paired or not (paraphysis), symmetrical or asymmetrical. Asymmetry may be the result of difference in form, or of two parts lying in asymmetrical planes, or of a single paraphysis not lying in the median plane. They may articulate with the connective and with the aedeagus or may be separate from either or both.

The aedeagus may articulate at its base with the apex of the connective, or it may be widely separated from the latter, often occurring more closely associated with the anal tube (abdominal segments X plus XI) than with the connective. The aedeagus is nearly always constant in form within a species. Basically, it is campaniform. The basal ring is the atrium. Occasionally the atrium has an anterior extension, the preatrium, from its ventral basal portion. The preatrium, when present, usually articulates with the connective. The "shaft" of the aedeagus is the part traversed by the gonoduct, and also the part beyond the gonopore unless this part appears as a process. Processes may arise from any portion of the aedeagus, and are referred to in terms of where they arise (e.g. atrial processes, shaft processes).

Rarely, there may be one or more processes from the anal tube, in the males.

The abdominal sternum VII of the female may vary from slightly to strongly produced posteriorly, and the form of the posterior margin may be useful in classification. The form of female abdominal tergum IX, the pygofer, and its chaetotaxy are useful characters. The form of the second valvulae of the ovipositor, especially at their apices, and their armature of primary teeth and secondary denticles on the dorsal margin has been most helpful in relating the genera to one another. It should be noted that in the generic descriptions, the characters of the ovipositor are often based on relatively few species, and that the size of the small denticles of the second valvulae is often exaggerated in the figures.

Technique

The technique used for the preparation, study, and preservation of the male genitalia has been described by Oman (1949a:21), with some modifications by Young and Beirne (1958a:2).

Although some of the illustrations of the females in the present work, especially primary types, were made from undissected dry specimens, most of the female illustrations were made from specimens prepared as follows. The abdomen was removed and placed in an almost saturated solution of KOH overnight, without heating. The abdomen was then placed in tapwater for at least fifteen minutes, then moved to glycerine. Before dissection, the abdomen was moved to a deep-well slide containing glycerine. With fine needles sternum VII, the pygofer, and the anal tube were removed as a unit. After the genital chamber was observed for sclerites, sternum VII was severed at its base. The membranous connection between the third valvulae (the ovipositor sheath) and the pygofer was then severed. Each second valvifer was then pried loose at its articulation with the pygofer, and the weak connections between the inner rami of the first and second valvulae severed. This permitted the second valvifers, with the second and third valvulae attached, to be slid posteriorly, free of the other structures. The structures to be illustrated were then moved to another well-slide on which, at the bottom of the depression, a narrow line of boric acid ointment had been smeared before the depression was filled with glycerine. Structures were then oriented properly and pressed into the edge of the ointment which held them securely during illustration. Often the second valvulae were detached and placed in a drop of glycerine on a flat slide and covered with a cover glass for better resolution of the teeth. After the structures were illustrated, sternum VII and the detached portions of the ovipositor were placed into the abdominal cavity. The abdomen with its contents and the pygofer were then stored in glycerine in a glass vial in the manner commonly used for males.

Temporary slides of the forewing were made by placing "posts" of boric acid ointment on a slide to support a cover glass, then placing the forewing on the slide and applying the cover glass. The ointment did not touch the wing, and the "air mount" resulting was superior to mounting in a medium, for observing the venation with transmitted light. The forewing was later attached to the specimen with a drop of glue.

Forewing characters may be seen well enough to run the generic key, by tilting the specimen forward. The veins are easier to see from such a dorsal and posterior view. The venation of the apical portion of the hindwing, sometimes used in the generic key is most readily observed in a specimen from which the abdomen has been removed. Since the use of the key requires dissection of a male, specimens without abdomens are usually at hand.

It is important to reemphasize that the small vials in which the genitalia are stored frequently get shaken up during shipment, with the result that the glycerine comes in contact with the cork. If this has happened, it is an important curatorial responsibility to transfer the preparations to clean vials in a few drops of glycerine and to replace the corks. If this is not done, eventually there will be damage to the labels and the pin, and ultimately to the preparations.

Illustrations

The illustrations were made with the aid of a camera lucida. More than half of those published here were made by Mrs. Judith Stewart, under my direction.

Additional illustrations were made by the author, by Miss Teresa Fulp, and by Mrs. Lily Shen. Some of the illustrations made by the author were inked by Miss Gillian M. Day at the British Museum (Natural History), by Miss Patricia Thompson, by Miss Fulp or Mrs. Shen. The technique used to prepare the structures is discussed in the preceding section.

The figures in the systematic portion of this work are lettered consistently as follows:

a, anterior dorsum (head, pronotum, and occasionally the scutellum), from dorsal view;
b, same structures as in *a*, from lateral view;
c, male pygofer and plate (setae of plate usually not shown), lateral view;
d, one male plate, ventral view;
e, one style and the connective, dorsal view;
f, aedeagus, lateral view;
g, aedeagus, caudoventral view;
h, male paraphysis or paraphyses;
i, female abdominal sternum VII, ventral view;
j, female pygofer, lateral view;
k, ovipositor, second valvula, lateral view, low magnification;
m, ovipositor, apex of second valvula;
n, ovipositor, second valvula, dorsal margin near midlength.

These explanations are not repeated hereafter in the legends to the figures. Additional structures illustrated are labeled with other letters but the letters are not used consistently. These structures are explained in the respective legends.

When the relationship of one of a pair of bilateral structures to its complement is important, the location of the median line has been indicated by a broken vertical line in the illustration. The remarks on the illustrations *a* and *b* in part 1 (p. 14) also apply to part 2.

TRIBE CICADELLINI

The subfamily Cicadellinae was discussed in Part 1 (pp. 15-17), and the tribe Proconiini was treated there. The remaining tribe, Cicadellini, includes those leafhoppers of the subfamily in which the knees (femoro-tibial joints) of the posterior legs, at rest, nearly always attain the posterior proepimeral margins; in which the male plates and pygofer almost always bear macrosetae; in which the antennal ledges are seldom protuberant in dorsal view; in which the posterior femora are much more flattened than in the Proconiini (where they tend to be more nearly square in cross-section); and in which the face is usually not pubescent.

The genera of Cicadellini are very much more difficult to place into groups than the Proconiini. The males alone present a most difficult problem in associating genera into groups with any degree of confidence. For this reason, the females were dissected, and their characters were also considered in judging relationships. The form of the second valvulae of the ovipositor was particularly helpful. Unfortunately, females of a number of species were not available, and none in some genera, hence the key to genera is restricted to males.

Groups of similar genera are represented in diagrams in appropriate positions in the text below. Occasionally, some genera and groups of genera in one

diagram could well be placed on another page, with another group. Such possibilities are suggested by framing a generic name in a broken line. This generic name will appear again in another diagram and suggest relationships between the groups of the respective diagrams. This graphic representation may have little relationship to phylogeny; it is a reflection of similarity in general appearance and in morphology of both males and females, as far as possible. It will be useful, hopefully, in enabling a reader to try alternatives in placing troublesome species which don't quite fit a given generic description or the associated illustrations.

The Cicadellini are an intricate group. Their morphology suggests rapid radiation and often shows small discontinuities compared with those found in many of the Proconiini. Ecological information is far too meagre, at present, to be useful to support or refute the associations of genera used here, and much testing and probably no inconsiderable changing of ideas concerning generic relationships are anticipated. The genera themselves, on the other hand, will probably be relatively more stable, except for the addition of numerous new species from the Neotropical region which is still not well known.

KEY TO MALES OF W. HEMISPHERE GENERA OF CICADELLINI [1, 2, 3]

1. *Cicadella*, from the Old World, is also included (p. 569).
2. *Parinaeota*, known only from a single female is not in the key, but is treated on page 79.
3. *Aspilodora* Melichar (p. 1096) and *Amalfia* Melichar (p. 1096) known only from females are not included in the key.

1. Abdominal sternum VIII bilobed; genitalia with an elongate median sclerite between connective and aedeagus
Palingonalia, new genus, page 427
Not as above 2

2. Hindwing with submarginal vein coinciding with apical wing margin; aedeagus and connective fused, pygofer and plates without setae
Vidanoana, new genus, page 1079
Without above combination of characters 3

3. Clypeus with median area strongly concave; plates lobiform, rounded apically, with multiseriate macrosetae; connective with apex directed anteriorly ..... *Serpa* Distant, page 1094
Without above combination of characters 4

4. Clypeus with median area strongly concave; hind femoral setal formula 2:0:0; forewings with anteapical plexus of veins
Chichahua, new genus, page 247
Without above combination of characters 5

5. Hindleg with femoral setal formula 2:0:0 6
Hindleg with femoral setal formula otherwise 16

6. Head with a complete carina separating crown from face 7
Head usually without a carina at transition from crown to face, if present then occurring only at apex 8

7. Paraphyses present, clypeus convex, pronotum transversely rugose
Trichogonia Breddin, page 49
Paraphyses absent, clypeus concave dorsally, pronotum not sculptured
Mesogonia Melichar (in part), page 480

8. Hindleg with setae of first tarsomere in two rows on plantar surface 9
Hindleg with setae of first tarsomere irregularly arranged or multiseriate on plantar surface 12

9. Very large robust species, length 19 mm; forewing with more than five apical cells ..... *Backhoffella* Schmidt, page 320
Smaller species; length less than 19 mm; forewing with four or five apical cells or with apical venation very irregular 10

10. Crown punctate or pitted 11
Crown without sculpturing ..... *Pamplona* Melichar, page 430

11. Forewing with central anteapical cell open basally (S. American) *Syncharina,* new genus, page 603
Forewing with central anteapical cell closed basally (N. American) *Helochara* Fitch, page 601

12. Forewing without an appendix ..... *Allonolla,* new genus, page 845
Forewing with an appendix 13

13. Forewing with an anteapical plexus of veins; plates without macrosetae 14
Forewing without an anteapical plexus of veins; plates with macrosetae 15

14. Antennal ledges each with a dorsal and an oblique carina; clypellus with profile of its lower portion markedly more nearly horizontal than remainder of face; aedeagal shaft without processes *Neiva* Melichar, page 30
Antennal ledges without carinae; clypellus with profile of its lower portion almost continuing contour of remainder of face; aedeagal shaft with a pair of short lateral processes ..... *Paracatua* Melichar, page 35

15. Antennal ledges with at least an oblique carina; with paraphyses and apical aedeagal processes (female abdominal sternum VII with posterior margin produced and notched) ..... *Aguana* Melichar, page 37
Antennal ledges without carinae; without paraphyses or aedeagal processes (female abdominal sternum VII not as above) *Ortega* Melichar, page 40

16. Forewing with outer anteapical cell short and lenticular, middle anteapical cell open basally, apical wing margin concave, with only three apical cells ..... *Diedrocephala* Spinola, page 322
Forewing differing in at least one of the above characters 17

17. Style apices twisted (fig. 855*e*) ..... *Tortigonalia,* new genus, page 1053
Style apices not twisted 18

18. Aedeagus in lateral view with shaft extending anteriorly near base, then curved dorsally and posteriorly through 180 degrees (fig. 593*f*), the apex directed posteriorly ..... *Balacha* Melichar, page 725
Aedeagus in lateral view not so, shaft never extending anteriorly at its base 19

19. Aedeagus with shaft slender and semicircular, arched dorsally then ventrally through 180 degrees, apex directed ventrally (fig. 592*f*) *Pegogonia,* new genus, page 722
Aedeagus not as above, if apex is directed downward (e.g. *Poeciloscarta* Stål) then shaft not arched as strongly or not as regularly 20

20. Abdomen with a marked constriction at its base *Lissoscarta* Stål, page 148
Abdomen without such a constriction 21

21. Hindwing with a deep emargination between jugum and remainder of wing ..... *Dilobopterus* Signoret (in part), page 104
Hindwing without such an emargination 22

22. Forewing in rest position usually exposing posterior meron; hindwing narrow apically and much shorter than forewing; pygofer with macrosetae very numerous, some occurring on its basal half
Dilobopterus Signoret (in part), page 104
Forewing rarely (*Poeciloscarta* (Stål)) exposing meron, other characters not as above 23

23. Pygofer process arising ventrally, extending posterodorsally and with a tuft-like group of small branches at its apex 24
Pygofer processes not as above, or absent 25

24. Forewing with three closed anteapical cells
Plerogonalia, new genus, page 526
Forewing with inner two anteapical cells open basally
Scopogonalia, new genus (in part), page 529

25. Plates very broad at base (figs. 209*d*, 877*d*), second posterior tarsomere with multiseriate setae on plantar surface 26
Plates narrower; second posterior tarsomere not so, or with setae minute 27

26. Large species, length more than 15 mm; plates elongate-triangular, with irregularly arranged macrosetae on ventral surface, the microsetae confined to lateral margin; aedeagus without processes
Sphaeropogonia Breddin, page 257
Species 13.7 mm, or less in length; plates short-triangular, with numerous irregularly arranged microsetae on ventral surface; aedeagus with one or two basal processes arising at base of shaft
Sonesimia, new genus, page 1084

27. Head with median length of crown nine-tenths of, to greater than transocular width 28
Head with median length of crown less than nine-tenths of transocular width 31

28. Head with a short conical thornlike process at apex
Eldarbala, new genus, page 261
Head without such a process 29

29. Forewing slightly concave at apex and with second apical cell narrowed apically, crown without a median fovea; pygofer without processes
Tipuana Melichar (in part), page 334
Without above combination of characters 30

30. Genitalia with at least one paraphysis present 31
Genitalia with paraphyses absent ..... *Platygonia* Melichar, page 420

31. Head with a carina, at least at apex, at transition from crown to face 32
Head without a carina between crown and face 41

32. Lateral clypeal sutures not extending onto crown; hind femoral setal formula 2:1:0; pygofer rolled ventrad apically and covering genital capsule posteriorly ..... *Naltaca,* new genus, page 904
Without above combination of characters 33

33. Proepimeron with an extra sclerite at least partially delimited by a distinct sulcus (fig. 795*b*) ..... *Mareja* Melichar, page 977
Proepimeron without such a sclerite 34

34. Forewing with a plexus of veins 36
Forewing without a plexus of veins 35

35. Specimens golden yellow to sordid yellow; forewings with golden pustules 36
Not as above, if yellow then forewings without golden pustules 38

36. Face flattened or concave ..... *Onega* Distant, page 285
Face convex 37

37. Posterior femoral setal formula 2:1:1 ..... *Draeculacephala* Ball, page 580
Posterior femoral setal formula 2:1:0
Carneocephala Ball (in part), page 583

38. Color golden yellow without dark markings; plates rounded at apices; paraphyses present and symmetrical
Aurogonalia, new genus, page 435
Not with above combination of characters 39

39. Lateral clypeal sutures seldom extending onto crown, and then not attaining ocelli ..... *Mesogonia* Melichar (in part), page 480
Lateral clypeal sutures extending onto crown and attaining ocelli or nearly so 40

40. Genitalia with paraphyses ..... *Pachitea* Melichar, page 328
Genitalia without paraphyses ..... *Pamplonoidea,* new genus, page 429

41. Genitalia with a joint between stem of connective and its base, the connective consisting of two sclerites as a result; *or* with paraphyses articulated with a Y-shaped connective and functioning as an articular structure between connective and aedeagus 42
Genitalia not as above 44

42. Forewing with only two anteapical cells of which the outer one is open basally ..... *Ciminius* Metcalf and Bruner, page 589
Forewing with three anteapical cells of which the inner two are open basally 43

43. Pygofer with a lateroventral process on each side, aedeagus relatively long and slender ..... *Scopogonalia,* new genus (in part), page 529
Pygofer without processes, aedeagus relatively shorter and broader
Tylozygus Fieber, page 585

44. Style with a conspicuous tuft of setae on preapical lobe
Barbinolla, new genus, page 906
Style without such a group of setae, or without a preapical lobe 45

45. Aedeagus with an elongate, unpaired, often bizarre apical (or apparently anteapical) process that does not lie in median sagittal plane (figs. 56*g*, 356*q*) 46
Aedeagus without such a process 48

46. Pygofer with an acute apical process
Ramosulus, new genus (in part), page 438
Pygofer without an apical process 47

47. Robust species, length more than 8 mm; scutellum with posterior half elevated in profile ..... *Apulia* Distant, page 81
Slender, delicate species, length less than 8 mm; scutellum not as above
Allogonia Melichar (in part), page 831

48. Apical margin of clypellus concave or appearing emarginate medially between the slightly enlarged lateral lobes (fig. 243*p*), rarely (*Parathona cayennensis* (Gmelin)) transverse-rectilinear; forewing with outer anteapical cell not very narrow; crown with very small impressions 49
Apical margin of clypellus not concave or emarginate, or if so then with outer anteapical cell of forewing very narrow (*Catagonalia* Evans, fig. 868*q*) *or* with lenticular impressions on crown (*Graphocephala* Van Duzee, in part) 52

49. Aedeagus with an apicoventral acute process
Jozima, new genus, page 294
Aedeagus without such a process 50

50. Ocelli separated from posterior margin of crown by a distance not or not much greater than the ocellar diameter
Parathona Melichar, page 303
Ocelli separated from posterior margin of crown by a distance considerably greater than ocellar diameter 51

51. Crown with a full length median fovea; apical margin of forewing with a concavity ..... *Lebaja,* new genus, page 301
With neither of the above characters ..... *Baleja* Melichar, page 295

52. Forewing with only one or two short anteapical cells, occurring more distally than claval apex (fig. 782*p*)
Hadria Metcalf and Bruner, page 965
Forewing not as above 53

53. Length 10 mm or more and forewings (usually unmarked or with orange spots) translucent, orange-yellow to sordid tan or gray; styles truncate apically; paraphyses absent 54
Without above combination of characters 55

54. Forewings with some purple linear markings; pygofer strongly produced, attenuate and with pegs on dorsal margin of narrowed portion
Tacora Melichar, page 313
Forewings without such markings; pygofer not as above
Paromenia Melichar, page 263

55. Forewing with a plexus of veins and posterior femoral setal formula 2:1:0 56
Forewing without a plexus of veins, or if present, then posterior femoral setal formula 2:1:1 57

56. Crown with pits or small lenticular impressions on disk; dorsal pygofer processes usually present 57
Crown without such sculpture; dorsal pygofer processes absent
Carneocephala Ball (in part), page 583

57. Forewing hyaline to pale translucent, with inner two anteapical cells open basally; with abdominal apodemes truncate or capitate
Plesiommata Provancher, page 595
Forewing without above combination of characters 58

58. Forewing concave at apex 59
Forewing with apical margin convex 62

59. Forewing with second apical cell strongly narrowed apically and forewings red marked with black or black marked with red
Ladoffa, new genus, page 339
Forewing with second apical cell usually not strongly narrowed apically, if so narrowed then markings not as above 60

60. Pygofer strongly concave posteroventrally (fig. 354*c*); aedeagal shaft directed ventrally ..... *Medlerola,* new genus, page 436
Without above combination of characters 61

61. Paraphyses asymmetrical ..... *Tipuana* Melichar (in part), page 334
Paraphyses symmetrical ..... *Iragua* Melichar, page 399

62. Hindwing with outer apical cell broadened apically and with its apex close to apex of costal margin; forewings with a plexus of veins; plates without macrosetae; paraphyses absent (West Indies)
Cibra, new genus, page 1076
Without above combination of characters (several localities including West Indies) 63

63. Forewings pitted; pronotum usually extending posteriorly as far as transverse depression of scutellum (exceptions: *infuscata* (Melichar), *clathrata* (Signoret)); scutellum swollen behind transverse depression
Teleogonia Melichar, page 158
Forewings occasionally punctate, but not pitted, other characters not as above 64

64. Crown of head with small lenticular impressions on disk between ocelli; or more laterally, behind each ocellus 65
Crown of head with impressions not lenticular when present 77

65. Genitalia without paraphyses 66
Genitalia with paraphysis or paraphyses 70

66. Aedeagus without processes 80
Aedeagus with one or more processes 67

67. Aedeagus with a single median ventral process
Manzutus Oman, page 838
Aedeagus with paired processes, or with a group of anteapical processes 68

68. Pygofer with processes arising ventrally, extending posterodorsally
Punahuana, new genus (in part), page 317
Pygofer not so 69

69. Pygofer with dorsal processes
Amphigonalia, new genus (in part), page 825
Pygofer without processes ..... *Isogonalia,* new genus (in part), page 819

70. Paraphyses with rami 71
Paraphysis a median plate, without rami, or absent 75

71. Paraphyses with rami symmetrical
Chlorogonalia, new genus (in part), page 573
Paraphyses with rami asymmetrical 72

72. Plates with multiseriate microsetae, without macrosetae 73
Plates with at least some macrosetae, which may or may not be uniseriate 74

73. Small species, length 4.1-5.5 mm; posterior tibial row 2 consisting of 6 setae; aedeagal shaft relatively long (fig. 681*f*)
Decua Oman, page 842
Larger species, length 7.8 mm or more; posterior tibial row 2 consisting of approximately 10 or 11 setae; aedeagal shaft relatively short (fig. 680*p*)
Campecha Melichar, page 840

74. Clypeus with lenticular impressions on its median portion
Plummerella DeLong, page 902
Clypeus with round impressions (punctate), or granular
Graphocephala Van Duzee (in part), page 849

75. Pygofer process present ..... *Amphigonalia,* new genus (in part), page 825
Pygofer process absent 76

76. Plates extending posteriorly as far as pygofer apex
Isogonalia, new genus (in part), page 819
Plates not extending posteriorly as far as pygofer apex
Allogonia Melichar (in part), page 831

77. Pronotum with a distinct anterior collar; connective a transverse bar; paraphyses absent; pygofer without processes
Amblyscarta Stål, page 176
Pronotum usually without a collar, when present less distinct; without all of additional characters above 78

78. Crown, pronotum, scutellum, clypeus, and forewings punctate; aedeagus curved posterodorsally, its ventral margin concave
Tubiga, new genus, page 657
Punctation less extensive if present, *or* if as above, then with ventral margin of aedeagus straight or convex 79

79. Pygofer very strongly produced posteriorly and without processes (figs. 159*c*, 169*c*, 59*c*, 163*c*, 121*c*) 80
Pygofer not as strongly produced, *or* if so then with processes 90

80. Pronotum with greatest width equal to or greater than transocular width of head 81
Pronotum with greatest width less than transocular width of head 84

81. Plates abruptly narrowed apically (fig. 159*d*)
Poeciloscarta Stål, page 197
Plates not so 82

82. Ocelli located behind a line between anterior eye angles
Kogigonalia, new genus (in part), page 207
Ocelli located on or before a line between anterior eye angles 83

83. Pronotum with disk rugose ..... *Zaruma* Melichar, page 93
Pronotum without rugae ..... *Cardioscarta* Melichar, page 201

84. Larger, length to apices of forewings at repose more than 13 mm
Mucrometopia Melichar, page 156
Smaller, length less than 13 mm 85

85. Paraphyses paired and symmetrical 86
Paraphyses not as above or absent 87

86. Plates without macrosetae ..... *Ambigonalia,* new genus, page 825
Plates with macrosetae ..... *Oragua,* new genus (in part), page 612

87. Paraphyses with a single ramus that is not median
Segonalia, new genus, page 999
Without paraphysis or paraphyses 88

88. Aedeagus with its dorsal margin convex, with processes
Macugonalia, new genus, page 941
Aedeagus with its dorsal margin concave or only very slightly convex (fig. 66*f*), aedeagus without processes 89

89. Style extremely short and broad (fig. 66*e*); plates with multiseriate macrosetae ..... *Tettiselva,* new genus, page 101
Style not so; plates with uniseriate macrosetae
Gorgonalia, new genus (in part), page 174

90. Pygofer with a dorsoapical subquadrate lobe 91
Pygofer without such a lobe 92

91. Paraphyses present; pygofer without a group of basiventral elongate microsetae ..... *Tettisama,* new genus, page 785
Paraphyses absent; pygofer with a group of basiventral elongate microsetae (fig. 642*c*) ..... *Aguahua,* new genus, page 792

92. Pygofer with a process arising on inner surface on each side, extending mesad or posteromesad 93
Pygofer without such a process 94

93. Color pattern of anterior dorsum consisting of longitudinal stripes
Sibovia China (in part), page 696
Color pattern of anterior dorsum otherwise
Versigonalia, new genus, page 1088

94. Aedeagus with a dorsoapical and a ventroapical process, both slender, acute, their axes strongly diverging from axis of shaft; hindwing with outer cell of apical series (cell R_5) reduced and located anteapically
Ramosulus, new genus (in part), page 438
Not as above 95

95. Plates bearing numerous conspicuous elongate microsetae (fig. 851*d*) 96
Microsetae present or absent, not conspicuous 100

96. Crown of head swollen and elevated at middle of posterior margin, aedeagus with shaft short and very broad (fig. 503*h*)
Oragua Melichar (in part), page 612
Without above combination of characters 97

97. Aedeagus with apical or anteapical processes; paraphyses absent
Punahuana, new genus (in part), page 317
Aedeagus without processes; paraphyses present 98

98. Crown of head, in lateral view, with a transverse concavity before ocelli 99
Crown of head without such a concavity
Oragua Melichar (in part), page 612

99. Plates with elongate microsetae arising only on or near apex of each plate; aedeagus not lobate at apex ..... *Crossogonalia,* new genus, page 996
Plates with elongate microsetae not so restricted, occurring also on basal portion; aedeagus lobate at apex .... *Borogonalia,* new genus, page 1048

100. Crown of head and forewings punctate; crown with median length more than one-half transocular width 101
Crown of head and forewings not punctate, *or* if so then median length of crown less than one-half transocular width 102

101. Pygofer densely setose; aedeagus with processes (SE. Brazil)
Oragua, new genus (in part), page 612
Pygofer with setae fewer; aedeagus without processes (Chile)
Helocharina Melichar, page 608

102. Median area of clypeus rugose 103
Median area of clypeus smooth, granular, or punctate, not rugose 108

103. Aedeagus with paired processes at or near apex (occurs in West Indies) *Ehagua* Melichar, page 1081
Aedeagus without paired processes near apex (no species in West Indies) 104

104. Aedeagus with dorsal apodemes very long (fig. 134*f*), longer than aedeagal shaft; paraphyses absent 105
Aedeagus with dorsal apodemes much shorter; paraphyses present 106

105. Head with transocular width less than width of pronotum; disk of crown with diagonal rugae on each side of median line *Uperogonalia,* new genus, page 54
Head with transocular width less than width of pronotum; disk of crown without sculpturing ..... *Begonalia,* new genus, page 171

106. Aedeagal shaft short and with gonoduct traversing it vertically, with the gonopore ventral (fig. 194*f*) *Paratubana,* new genus (in part), page 239
Aedeagus not as above 107

107. Plates with multiseriate macrosetae; aedeagal shaft with ventral margin convex (except small basal emargination in *T. desmotis,* n. sp.) *Tahuampa,* new genus, page 46
Plates with uniseriate macrosetae; aedeagal shaft with ventral margin concave 108

108. Aedeagus with shaft directed ventrad or posteroventrad *and* forewing with anteapical cells closed basally 109
Aedeagus with shaft directed otherwise, at least in its basal half, *or* if as above, then with inner anteapical cell open basally 115

109. Genitalia without paraphyses 110
Genitalia with paraphyses 111

110. Pronotal width greater than transocular width of head; pygofer with a dorsal process or a dorsal lobe partially separated from remainder of pygofer ..... *Janastana,* new genus, page 214
Pronotal width less than transocular width of head; pygofer without such a process or lobe ..... *Ruppeliana,* new genus, page 747

111. Genitalia with asymmetrical paraphyses *Beirneola,* new genus, page 547
Genitalia with symmetrical paraphyses 112

112. Pronotum much wider than transocular width of head *Schildola,* new genus (in part), page 680
Pronotum not so 113

113. Aedeagus without processes on shaft 114
Aedeagus with basiventral processes on shaft 115

114. Length less than 7.5 mm; aedeagus in lateral view not broader in apical than in basal half; anterior margin of pronotum very strongly convex (fig. 432*a*) ..... *Rotigonalia,* new genus, page 521
Length more than 8 mm; aedeagus in lateral view broader in apical than in basal half; anterior margin of pronotum much less convex (fig. 181*a*) *Exogonia* Melichar, page 222

115. Style short, very broad and truncate at apex (fig. 842*e*); forewings not punctate 116
Style not as above, or if so then the forewings are punctate 119

116. Paraphysis asymmetrical; aedeagal shaft extremely short (fig. 548*f*); forewing thickly beset with small yellow spots *Scoposcartula,* new genus (in part), page 669
Not as above 117

117. Aedeagus with broad basiventral processes on shaft *Oragua,* new genus (in part), page 612
Aedeagus not as above 118

118. Length more than 10 mm; midclypeal area broadly granulate; connective greatly exceeding style apex (S. America) *Jakrama,* new genus (in part), page 686
Length less than 9 mm; midclypeal area not granulate; connective not exceeding style apex (Central America) *Tlagonalia,* new genus, page 1037

119. Crown and midclypeus coarsely punctate; pronotum coarsely punctate and rugose; connective and paraphyses fused *Trachygonalia,* new genus, page 694
Not as above 120

120. Plates very slender with few small macrosetae; styles very long and slender, slightly exceeding apices of plates; specimens approximately 15 mm long ..... *Xenogonalia,* new genus, page 219
Without above combination of characters 121

121. Plates without macrosetae 122
Plates with macrosetae (small in *Rhopalogonia* Melichar) 124

122. Paraphyses absent; robust species with forewings coriaceous, usually brick-red, and marked with yellow; plates fused basally *Agrosoma* Medler, page 42
Paraphyses present; if robust then plates are not fused basally; forewings not so marked 123

123. Robust species with plates not fused basally; anterior dorsum without a median dorsal black stripe ..... *Cephalogonalia* Evans, page 80
Slender species with plates fused basally; anterior dorsum with a median dorsal black stripe ..... *Fonsecaiulus,* new genus (in part), page 760

124. Forewings strongly coriaceous, elytra-like 125
Forewings opaque, translucent, or hyaline, less thickened, often apparently flexible 127

125. Plates fused basally, with macrosetae multiseriate; pygofer with an apical process (exception: *Selvitsa exaireta,* n. sp.)
Selvitsa, new genus, page 659
Plates separate throughout their length, almost always with macrosetae uniseriate; pygofer without an apical process 126

126. Length (to apex of forewings in repose) 10.9-15.5 mm; style apex not broadly truncate; forewings often not punctate, color pattern involving transverse transcommissural bands
Jakrama, new genus (in part), page 686
Length 5.2-10.7 mm; style often truncate at apex; forewings punctate at least in claval area, color pattern not (exception: *O. partitula* (Jacobi)) involving transverse transcommisural bands
Oragua Melichar (in part), page 612

127. Forewing with bases of at least two of the anteapical cells occurring more distally than claval apex 128
Forewing with bases of at least two of anteapical cells occurring more proximally than claval apex or with venation obscured 134

128. Forewing with base of middle anteapical cell occurring more distally than bases of both adjoining anteapical cells 129
Forewing with base of middle anteapical cell not as above 130

129. Face with a vertical lenticular sclerite bordering lateral clypeal suture on each side, below eye and above lorum (fig. 749*b*)
Apogonalia Evans, page 916
Face without such a sclerite ..... *Cubrasa,* new genus, page 817

130. Pronotum rugose; least width of antennal ledge equal to diameter of an ocellus; paraphyses paired basally, with a single elongate ramus
Camaija, new genus (in part), page 959
Pronotum not rugose; least width of antennal ledge at least twice diameter of an ocellus; paraphyses greatly reduced and inconspicuous, or absent 131

131. Paraphyses vestigial; forewing with white crossveins at bases of anteapical cells ..... *Bubacua,* new genus, page 815
Without the above combination of characters 132

132. Aedeagus without processes ..... *Camaija,* new genus (in part), page 959
Aedeagus with processes 133

133. Aedeagus with paired processes arising at base of shaft (additional processes may be present) ..... *Camaija,* new genus (in part), page 959
Aedeagus without processes at base, paired retrorse processes arising more distally 134

134. Hindwings with vein R_{2+3} entire (fig 27*p*) (except in *S. decorata* (Walker)); clypeus not as convex as in other genera, appearing broader as result; specimens robust ..... *Stehlikiana,* new genus, page 56
Hindwings with vein R_{2+3} absent or incomplete (except in rare specimens of a few species); clypeus narrower in appearance, appearance often slender 135

135. Forewings mostly subhyaline 136
Forewings translucent to opaque 138

136. Forewings with clavus dark; aedeagus with small lateral papilioniform processes near midlength of shaft
Juliaca Melichar (in part), page 443
Forewings and aedeagus not as above 137

137. Plates exceeding pygofer apex, narrow basally; forewings marked with black ..... *Rhopalogonia* Melichar, page 255
Plates not extending posteriorly as far as pygofer apex, broader basally; forewings without black markings ..... *Dasmeusa* Melichar, page 291

138. Crown and midclypeus glabrous; forewings with clavus finely punctate, black with red markings; pygofer apex obliquely truncate
Schildola, new genus (in part), page 680
Not as above 139

139. Aedeagus drastically asymmetrical (figs. 643*f*, 647*f*); paraphyses absent or present and asymmetrical 140
Aedeagus symmetrical or nearly so (gonopore may be lateral); if markedly asymmetrical then paraphyses are symmetrical 143

140. Paraphysis or paraphyses present; crown unmarked or with median spots 141
Without paraphysis or paraphyses; crown with bilateral black markings or a median black line ..... *Nielsonia,* new genus, page 794

141. Aedeagal shaft asymmetrical 142
Aedeagal shaft symmetrical ..... *Schistogonalia,* new genus, page 812

142. Crown with a pair of narrowly separated longitudinal diverging lines
Allogonia Melichar (in part), page 831
Crown with median spots ..... *Macunolla,* new genus, page 801

143. Species with a fusiform black marking extending from anterior margin of crown to claval apex ..... *Fusigonalia,* new genus, page 555
Not as above 144

144. Plates abruptly narrowed near midlength, thence divaricate (seen best in unmacerated specimens) to apices; paraphyses asymmetrical
Willeiana, new genus, page 167
Without the above combination of characters 145

145. Forewing with the inner or the two innermost anteapical cells open basally 146
Forewing with three closed anteapical cells (outermost rarely very narrow and difficult to see) 148

146. Connective greatly exceeding style apex; head not strongly produced 147
Connective not exceeding style apex; head well produced
Sisimitalia, new genus, page 756

147. Head not broader than pronotum; aedeagal shaft curved gradually posteroventrally ..... *Cyclogonia* Melichar, page 539
Head broader than pronotum; aedeagal shaft straight
Cinerogonalia, new genus, page 754

148. Plates with multiseriate macrosetae; hind knees not attaining posterior proepimeral margin in rest position; aedeagus without processes; hindwing with outer apical cell broadened and almost touching costal margin (fig. 883*p*) ..... *Bucephalogonia* Melichar, page 1092
Not as above 149

149. Forewing with middle anteapical cell large and conspicuous (fig. 868*q*), outer anteapical cell very narrow and inconspicuous, venation distinct ..... *Catagonalia* Evans, page 1068
Forewing not as above, or with venation obscure 150

150. Aedeagus with apex of shaft curved abruptly posteriorly or ventrally (figs. 528*f*, 169*f*), or at least with the gonoduct so curved 151
Not as above 152

151. Length less than 8.1 mm; somber species with color markings small when present ..... *Acrulogonia,* new genus, page 643
Length more than 14.5 mm; forewings purple
Kogigonalia, new genus (in part), page 207

152. Abdominal segment X (basal segment of anal tube) with an apical process on each side (figs. 634*q*, 635*q*) ..... *Inuyana,* new genus 778
Abdominal segment X without such a process 153

153. Color red or orange marked with black; aedeagus (figs. 305*f*, 308*f*) with ventral margin usually smoothly concave, with an anteapical or apical (most often) ventral process; antennal ledges in anterolateral view not extending ventrally in front of antennal insertions
Soosiulus, new genus, page 369
Without above combination of characters 154

154. Species small (4.7-6.7 mm), black, marked with ivory spots or bands; head obtusely triangular in dorsal view; aedeagus with processes; paraphyses absent or vestigial ..... *Microgoniella* Melichar, page 410
Species of various lengths, if black then larger and with head less strongly produced, or if black with produced head and ivory markings, then aedeagus without processes and genitalia with paraphyses well developed 155

155. Aedeagus in lateral view very short, broad, and either with basiventral processes (fig. 840*f*) or with ventral margin angular at midlength (fig. 841*b*); paraphyses with a single ramus that is not in median plane
Cuitlana, new genus, page 1032
Without above combination of characters 156

156. Head very short and broad in dorsal view (figs. 195*a*, 205*a*); plates not extending posteriorly as far as pygofer apex; costal area of forewings not less opaque opposite outer anteapical cell 157
Without above combination of characters 160

157. Aedeagus with apical process
Paratubana, new genus (in part), page 239
Aedeagus without apical processes 158

158. Aedeagus with a pair of processes arising ventrally on atrium; paraphyses vestigial; apex of head slightly concave in dorsal view
Orechona Melichar, page 252
Without above combination of characters 159

159. Aedeagus short, and broadened apically, often with its dorsal margin developed into a lobe ..... *Amblyscartidia,* new genus, page 226
Aedeagus slender and with a ventral shaft process
Scoposcartula, new genus (in part), page 669

160. Aedeagus falcate; plates each with numerous irregularly arranged microsetae in apical half; paraphyses absent; width of pronotum greater than transocular width of head ..... *Torresabela,* new genus, page 790
Without above combination of characters 161

161. Specimens red or dark with a large median pale spot on pronotum, or on both pronotum and on crown, or with a common pale spot crossing posterior margin of crown (but not attaining posterior pronotal margin); if pronotal spot is partly or completely interrupted medially, then forewings each with a pair of conspicuous round yellow spots 162
Not as above 163

162. Pronotum with a median pale spot and two oblique posterolateral spots; length more than 13 mm
Kogigonalia, new genus (in part), page 207
Pronotum not so marked; length less than 10 mm
Erythrogonia Melichar (in part), page 767

163. Forewings each with a zigzag orange stripe, partly bordered with ivory
Erythrogonia Melichar (in part), page 767
Forewings not as above 164

164. Crown orange-red or bronze-red with a median pale spot extending into pronotum, and wings dark red with darker apices
Erythrogonia Melichar (in part), page 767
Not as above 165

165. Crown and pronotum with a median black stripe; lateral pronotal margins bordered with black; forewings with two large ivory spots outlined in dark brown ..... *Erythrogonia* Melichar (in part), page 767
Not marked as above 166

166. Style trilobate at apex ..... *Erythrogonia* Melichar (in part), page 767
Style not so 167

167. Species entirely orange heavily marked with black on face, crown, pronotum, scutellum, and forewings, the black markings of the forewings delimiting at least some circular orange spots
Pawiloma, new genus (in part), page 729
Not as above 168

168. Head and pronotum each with a broad basal complete band; forewings orange with an oblique yellow spot across claval suture and a narrow transverse yellow line at claval apex
Nannogonalia, new genus, page 745
Not as above 169

169. Species with an orange or red band at anterior margin of crown, but without a red brachial cell in forewing 170
Species without such a band, or if so (*Sibovia pileata* (Fowler)) then brachial cell is red 172

170. Genitalia asymmetrical ..... *Stephanolla,* new genus, page 1024
Genitalia symmetrical 171

171. Genitalia with paraphyses present .... *Coronigonalia,* new genus, page 1001
Genitalia with paraphyses absent .... *Coronigoniella,* new genus, page 1004

172. Specimens pale orange to yellow with an apical black spot on crown, a median dark spot on pronotum, and transverse or oblique narrow black to brown bands on forewings in repose
Sailerana, new genus, page 308
Not as above 173

173. Pygofer gradually tapered to a very acute apex; color black with red spots ..... *Miarogonalia,* new genus, page 728
Without above combination of characters 174

174. Pygofer processes present 175
Pygofer processes absent 182

175. Paraphyses asymmetrical *and* with one of the rami membranous basally
Graphocephala Van Duzee (in part), page 849
Paraphyses not as above, or absent 176

176. Aedeagus with paired processes arising on shaft
Pawiloma, new genus (in part), page 729
Aedeagus without paired processes, or if present then apical in location 177

177. Paraphysis or paraphyses present; smaller species (length 5.0-6.3 mm); crown bearing narrow linear black markings
Graphogonalia, new genus, page 981
Without paraphysis or paraphyses; larger species (length 6.7 mm or more); crown with larger markings or with only conspicuous spot at apex 178

178. Pygofer with a basidorsal process ..... *Lautereria,* new genus, page 1060
Pygofer with process apical, dorsoapical or posteroventral and without a basidorsal process 179

179. Pronotum with a bilobed orange anterior area bordered with black; forewing orange with a concolorous orange oval, outlined in black, in anterior half of wing and another opposite claval apex; pygofer processes elongate, directed anteromesally and crossing the median line
Erythrogonia Melichar (in part), page 767
Not as above 180

180. Pygofer with a posteroventral process; color chiefly orange
Pawiloma, new genus (in part), page 729
Pygofer with process apical or dorsoapical; color chiefly dark green, bluish-green, or castaneous 181

181. Plates gradually tapered from base to apex, extending posteriorly as far as pygofer apex; color chiefly dark green or bluish-green
Tantogonalia, new genus, page 1071
Plates abruptly tapered near midlength, not extending posteriorly as far as pygofer apex ..... *Kogigonalia,* new genus (in part), page 207

182. Forewing thickly beset with yellow spots at least in basal half, or with yellow dots and vermiculations, or if not so, then pygofer with basiventral convexity 183
Forewing not as above 184

183. Length more than 8 mm; ocelli behind a line between anterior eye angles
Scoposcartula, new genus (in part), page 669
Length less than 7 mm; ocelli in line with anterior eye angles
Hanshumba, new genus, page 260

184. Paraphysis unpaired 185
Paraphyses paired or absent 186

185. Paraphysis located in median sagittal plane *and* crown without dark markings (Brazil) ..... *Oeogonalia,* new genus, page 220
Paraphysis not located in median plane *or* if so, then crown with dark markings or entirely dark (West Indies)
Caribovia, new genus, page 909

186. Paraphyses present and symmetrical 187
Paraphyses absent or present and asymmetrical 190

187. Face, crown, and pronotum unmarked yellow; forewing purple with three conspicuous spots yellow to paler purple; aedeagus with paired anteapical ventral process ..... *Pawiloma,* new genus (in part), page 729
Without the above combination of characters 188

188. Paraphyses with stalk slender, as long as, or longer than rami; aedeagus without processes or with an unpaired ventral process
Kogigonalia, new genus (in part), page 207
Paraphyses with basal portion short and transverse; aedeagus with dorsoapical processes or without processes but with a well developed dorsoapical lobe 189

189. Aedeagus with a pair of dorsoapical processes
Geitogonalia, new genus, page 524
Aedeagus without processes, with a large dorsoapical lobe
Caragonalia, new genus, page 244

190. Paraphyses present and appearing contorted, or asymmetrical in form and in position of rami 191
Paraphyses absent, *or* present and symmetrical in form but asymmetrical in position of rami 192

191. Paraphyses with one of rami membranous basally, aedeagus with basal apodemes relatively short (fig. 730*p*); crown of head marked in a linear pattern (fig. 730*a*)
Graphocephala Van Duzee (in part), page 849
Paraphyses with rami not membranous; aedeagus with basal apodemes very long (fig. 843*f*); crown of head not so marked
Caldwelliola, new genus, page 1039

192. Genitalia with paraphyses usually present (absent in some species of *Juliaca* Melichar) 193
Genitalia with paraphyses usually absent (present in an undescribed species of *Kapateira,* new genus) 202

193. Species green or yellowish-green; crown with median dark marking(s)
Chlorogonalia, new genus (in part), page 573
Species not green or yellowish-green, or if so then crown with paired markings or transverse markings, or none, forewings not marked as above 194

194. Specimens green or yellowish-green; crown marked with a pair of black spots (occasionally absent) (Old World species)
Cicadella Latreille, page 569
Specimens variously colored, but not as above (New World species) 195

195. Plates extending posteriorly as far as pygofer apex; species often marked with transverse bands on pronotum or forewings, or black with yellow or ivory spots on forewings ..... *Juliaca* Melichar (in part), page 443
Plates not extending posteriorly as far as pygofer apex; species often marked with longitudinal bands on pronotum and crown, or with diagonal orange stripes on forewings 196

196. Aedeagus with apical processes 197
Aedeagus without apical processes 199

197. Length less than 6.8 mm and male plates fused basally
Subrasaca, new genus (in part), page 472
Length more than 7.4 (usually 8.4 mm or more); male plates fused basally or not 198

198. Paraphyses very widely separated at base or consisting of a broad transverse bar ..... *Pawiloma,* new genus (in part), page 729
Paraphyses not so ..... *Aguatala,* new genus, page 788

199. Style with a preapical lobe; crown without an orange band parallel to anterior margin (exceptions: *Sibovia pileata* (Fowler); *Subrasaca ignicolor* (Signoret)) 200
Style without a preapical lobe; crown with an orange band parallel to anterior margin ..... *Ferrariana,* new genus, page 1029

200. Species chocolate-brown with a broad yellow median stripe from apex of crown to apex of clavus
Fonsecaiulus, new genus (in part), page 760
Not as above 201

201. Crown, and usually pronotum also, with transverse band or bands; paraphyses without a joint between basis and each ramus; plates fused basally ..... *Subrasaca,* new genus (in part), page 472
Crown most often with longitudinal stripes that are often convergent anteriorly; paraphyses almost always with a joint between basis and each ramus; plates not fused basally
Sibovia China (in part), page 696

202. Male pygofer slender and longer (fig. 654*c*) with macrosetae few and limited to anteapical portion; aedeagal shaft extremely short (fig. 654) and without basal processes
Hortensia Metcalf and Bruner, page 807
Male pygofer shorter and with setae more numerous and more dispersed; aedeagal shaft longer, or if short then with basal processes 203

203. Aedeagus falcate in lateral view (fig. 649*f*) or with processes 204
Aedeagus neither falcate nor with processes 206

204. Forewing red with black apex
Pawiloma, new genus (in part), page 729
Forewing color otherwise 205

205. Forewing mostly deep green with black veins, apex orange (S. Brazil)
Laneola, new genus, page 1075
Forewing without above color pattern (unknown from Brazil)
Kapateira, new genus, page 805

206. Plates extending posteriorly beyond apex of pygofer; black markings of crown extensive (figs. 136*a*, 136*p*); aedeagus not bisinuate
Gorgonalia, new genus (in part), page 174

Plates not extending posteriorly as far as apex of pygofer; black markings of crown median (fig. 602*a*); aedeagus bisinuate
Pawiloma, new genus (in part), page 729

1. Genus NEIVA Melichar

Figures 1-3

Neiva Melichar, 1925a:368. Type-species: *N. rufipes* Melichar, by original designation and monotypy.

Acharista Melichar, 1925a:368. Type-species: *A. variolata* Melichar, by original designation. New synonymy.

Length of male 11.0-12.0 mm, of female 10.4-11.1 mm.

Head moderately produced, median length of crown varying from slightly less than four-tenths to slightly more than one-half interocular width and from slightly less than three-tenths to less than four-tenths transocular width, anterior margin varying from broadly rounded to subangulate in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each approximately equidistant from median line and adjacent anterior eye angle, crown concave between ocelli, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges protuberant or not in dorsal view, each with a dorsal and an oblique carina, in lateral view with anterior margin oblique and rectilinear; clypeus convex or flattened medially, muscle impressions not or scarcely distinct, clypellus slightly produced, profile of its lower portion at an angle to contour of clypeus, pubescent, transclypeal suture obscure.

Thorax with pronotal width usually equal to or greater than transocular width of head (narrower in some specimens of *N. variolata* (Melichar)), lateral margins convergent anteriorly, dorsopleural carinae complete or not, posterior margin varying from broadly convex to slightly concave, disk coarsely rugose; scutellar surface strongly convex behind transverse sulcus, transversely rugulose or not. Forewing with or without a membrane, veins obscure, slightly elevated or not, with a number of supernumerary crossveins forming an anteapical plexus of veins, with apical cells very short and variable in number (apical venation irregular), texture strongly coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor; hindwing with vein R_{2+3} entire. Hindleg with femoral setal formula 2:0:0; tibiae with setae of rows 1 and 2 approximately equal in size, both widely spaced and without intercalary small macrosetae; length of first tarsomere equal to or less than combined length of two more distal tarsomeres and with numerous multiseriate setae on plantar surface.

Male genitalia: Pygofer not strongly produced, its apical margin variable interspecifically, without macrosetae. Plates subtriangular, not extending nearly as far posteriorly as pygofer apex, without macrosetae but with numerous microsetae. Style slender, extending posteriorly beyond apex of connective,

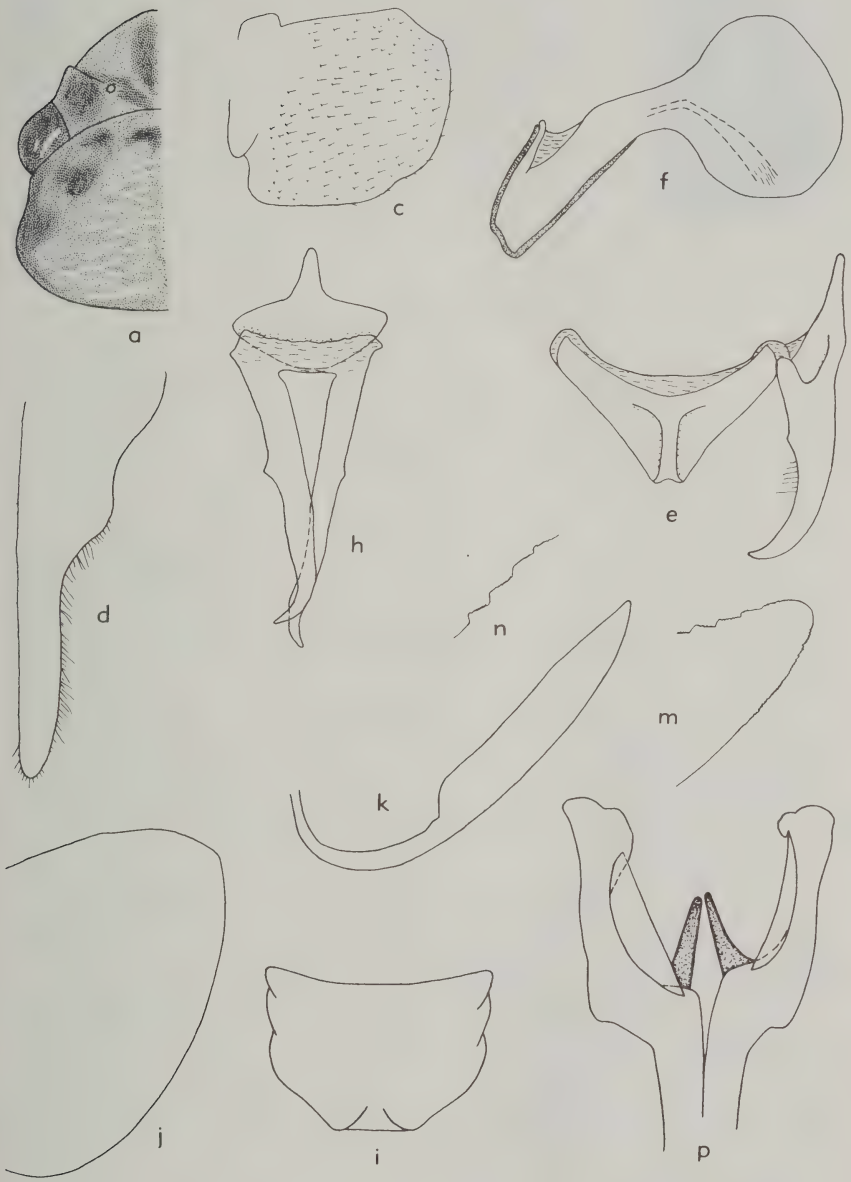


FIGURE 1. — *Neiva variolata* Melichar (*a-h*, from specimen from Cañamina, Bolivia; plate not shown in *c*; *i-p*, from Bolivia): *p*, Bases of second valvulae of ovipositor.

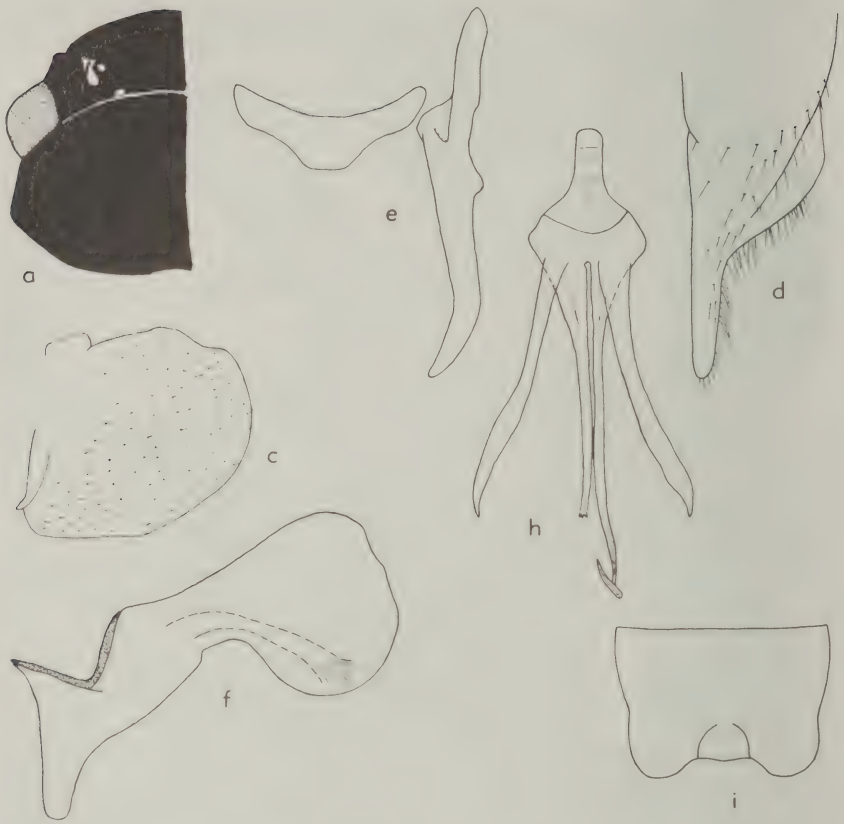


FIGURE 2. — *Neiva rufipes* Melichar (from specimens from Baños, Ecuador; plate not shown in *c*).

without a preapical lobe. Connective short or very short, triangular, with or without a median keel. Aedeagus symmetrical, not very short, with apex expanded in lateral view. Paraphyses paired and symmetrical.

Female abdominal sternum VII with posterior margin rounded laterally, with median posterior portion depressed and with its posterior margin variable interspecifically. Genital chamber with several sclerites in dorsal membrane. Ovipositor with second valvulae each broad beyond basal curvature, with broad quadrate primary teeth on dorsal margin, each with minute secondaries, with a number of anteapical minute teeth on dorsal and apicoventral margins, apex narrowly rounded. Pygofer broad, without setae.

The range of *Neiva* Melichar is Ecuador, Peru, and Bolivia. *Neiva* is related to *Paracatua* Melichar, *Ortega* Melichar, and *Aguana* Melichar, in all of which the species are robust in form, with posterior legs having femoral setal formula 2:0:0, tibial setal rows 1 and 2 both widely spaced, and with multiseriate setae on the plantar surface of the first tarsomere. *Neiva* is similar to *Paracatua* in having an

anteapical plexus on the forewings, and in the absence of macrosetae on the male plates, and differs from *Ortega* and *Aguana* in both of these characters. *Neiva* differs from *Paracatua* in the aedeagal shaft which is longer and lacks the processes present in *Paracatua*, and in the more extensive and numerous setae on the male pygofer. *Amalfia* Melichar (p. 1096) probably belongs in this complex of genera.

The genitalia of the male lectotype of *N. rufipes* Melichar agree well with the illustration published here; the female characters, not illustrated, are much as in *variolata* (Melichar). The genitalia of *Acharista variolata* Melichar and the lectotype of its synonym, *A. maculata* Melichar, also agree with the present illustrations.

NEIVA GENERIC GROUP

1. Neiva
2. Paracatua
3. Aguana
4. Ortega

Amalfia

SPECIES OF *NEIVA*

crassa, n. sp. Ecuador, Peru.
rufipes Melichar, 1925a:368. Ecuador.
variolata (Melichar), 1925a:369 (*Acharista*). Peru, Bolivia. New combination.
maculata (Melichar), 1925a:369 (*Acharista*). New synonymy.

KEY TO SPECIES OF *NEIVA*

1. Head triangular in dorsal view; pronotum with hindmargin broadly convex, without a median concavity ..... *variolata* (Melichar) (fig. 1)

   Head with anterior margin broadly rounded in dorsal view; pronotum with posterior margin slightly concave at middle 2

2. Face completely black; female abdominal sternum VII shallowly emarginate posteriorly; male pygofer with posterior margin broadly convex *rufipes* Melichar (fig. 2)

   Face castaneous with only clypeus bearing black markings; female abdominal sternum VII with posterior margin deeply emarginate; male pygofer with posterior margin attenuate and concavely truncate apically *crassa*, n. sp.

Neiva crassa, NEW SPECIES

FIGURE 3

Length of male 12.0 mm, of female 10.6-10.9 mm. Head with median length of crown varying from slightly less to slightly more than four-tenths interocular width and approximately three-tenths transocular width, anterior margin broadly rounded in dorsal view, antennal ledges slightly protuberant in dorsal view, clypeus convex medially, muscle impressions not distinct. Thorax with

pronotal width greater than transocular width of head, dorsopleural carinae complete, posterior margin broadly convex but with a shallow median concavity; scutellum not transversely rugose behind transverse sulcus. Forewing with a membrane, veins slightly elevated. Hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Other external characters as in generic description. Male pygofer gradually narrowed posteriorly to concavely truncate apex; plates as in *N. variolata* (Melichar) (fig. 1*d*); style with apical portion gently curved, acute at tip; connective longer than in other species in the genus, emarginate apically, not keeled; aedeagus in lateral view more arched than in other species of the genus, with apical portion less expanded; paraphyses short-stalked, with a single pair of rami. Female abdominal sternum VII with posterior margin deeply emarginate, the depressed area with its posterior margin bearing a slight median convexity.

Color of dorsum tan, with a broad area on each side of apex of crown and entire scutellum, black; pronotum occasionally (holotype) and humeral and commissural margins of clavus, castaneous; clypeus with lateral areas black, remainder of face, thoracic pleura, and legs, red to brown.

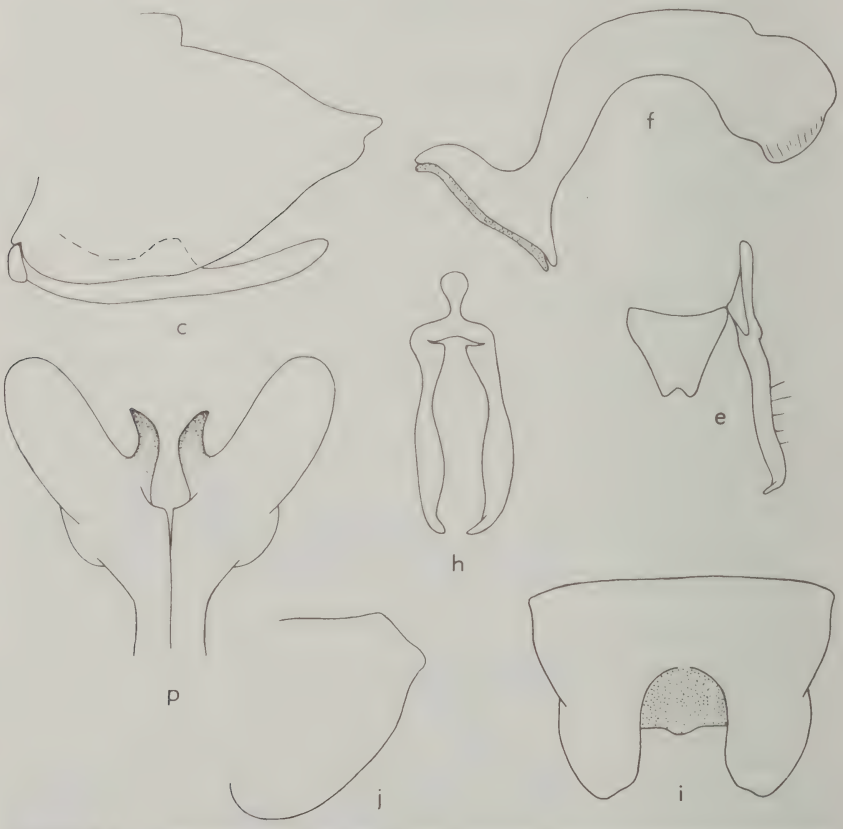


FIGURE 3. — *Neiva crassa*, n. sp. (*a-f*, from holotype; others from specimen from Loja, Ecuador): *p*, Bases of second valvulae of ovipositor.

Holotype male, Tingo María, Huánuco Province, Peru, October 8, 1946, 2200 ft. (J. C. Pallister) (AMNH). One female, Cuenca, Ecuador (BM). One female, Loja, Ecuador (R. Oberthur), 1903 (MHNP).

N. crassa, n. sp., is closely related to *N. rufipes* Melichar, from which it may be distinguished readily by the more arched aedeagus and the presence of only two rami in the paraphyses (four in *rufipes*) of the male, in addition to the characters set forth in the key.

2. Genus PARACATUA Melichar

Figures 4, 5

Paracatua Melichar, 1926a:340. Type-species: *Tettigonia rubrolimbata* Signoret, by subsequent designation of China (1938d:183).

Length of male 9.5-10-8 mm, of female 9.5-9.9 mm.

Head moderately produced, median length of crown varying from slightly less than four-tenths to one-half interocular width and from one-fourth to almost one-third transocular width, anterior margin broadly rounded, ocelli each slightly closer to median line than to adjacent anterior eye angle; antennal ledges slightly protuberant in dorsal view, in lateral view with anterior margins rectilinear and nearly vertical; clypeus convex, clypellus not produced, its profile almost continuing contour of clypeus, pubescent. Other head characters as in *Neiva* Melichar.

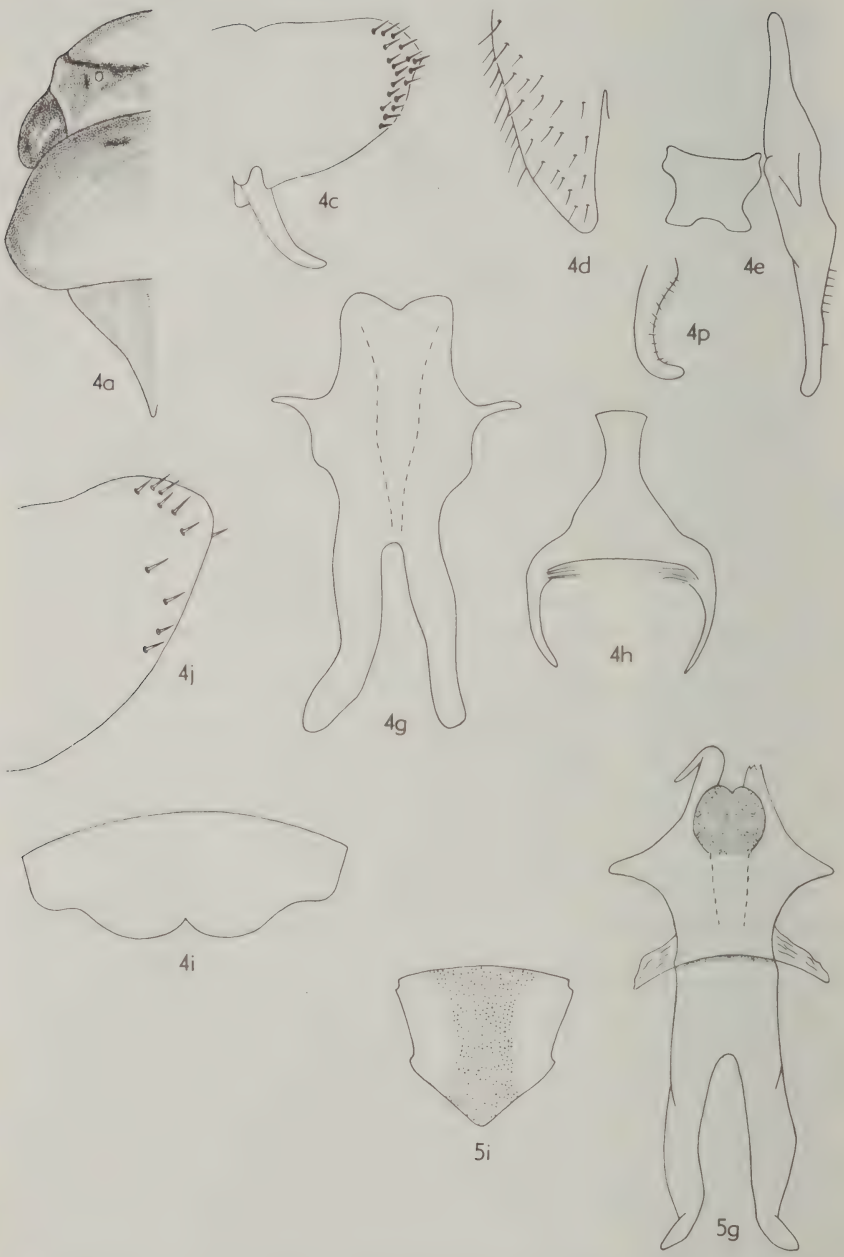
Thorax with pronotal width greater than transocular width of head, posterior margin very shallowly concave, disk indistinctly, transversely rugulose; scutellum transversely rugulose behind transverse sulcus, with surface not convex. Forewing without a membrane, veins obscure, not elevated. Hindleg with tibial setae of rows 1 and 2 approximately equal in size, both widely spaced, row 2 with intercalary small macrosetae; length of first tarsomere less than combined length of two more distal tarsomeres. Other characters as in *Neiva*.

Male genitalia: Pygofer not strongly produced, its apical margin convex, with a number of short macrosetae near and parallel to posterior margin. Plates short, subtriangular, not extending nearly as far posteriorly as pygofer apex, fused at base, with numerous regularly spaced multiseriate microsetae. Style slender, extending posteriorly very much beyond apex of connective, without a preapical lobe. Connective very short, somewhat quadrate, not keeled medially. Aedeagus symmetrical, shaft very short, with a pair of short lateral, and a pair of apical processes. Paraphyses biramous, the arms slender, tapering, and symmetrical.

Female (*Paracatua reichi* (Signoret) not dissected) abdominal sternum VII very short, its posterior margin with two convex lobes separated by a shallow median angular excision. Genital chamber with sclerotization of dorsal membrane extensive and complex. Ovipositor with second valvulae as in *Neiva*. Pygofer as in *Neiva*, but with sparse macrosetae near posterodorsal and posterior margin.

Paracatua Melichar occurs in Colombia and Venezuela. The genus is related to *Neiva* in the discussion of which diagnostic characters are treated.

Although I have seen the lectotype, a female, of *Tettigonia reichi* Signoret, the present interpretation of this species is based on two male specimens from Venezuela (AMNH) which agree fairly well with Signoret's original illustration.



FIGURES 4, 5. — 4, *Paracatua rubrolimbata* (Signoret) (*a-h*, *p*, from specimen from Bogotá, Colombia; *i*, *j*, from Alto Siboté, Colombia): *p*, Style apex from lateral view. 5, *P. reichi* (Signoret) (*g* from specimen from Mérida, Venezuela; *i* from lectotype).

The male genitalia of the lectotype of *Tettigonia rubrolimbata* Signoret agree with the illustrations published here, as do the genitalia of the lectotype of *Scaris sanguinosa* Walker.

SPECIES OF *PARACATUA*

reichi (Signoret), 1855d:797 (*Tettigonia*). Venezuela. New combination.
rubrolimbata (Signoret), 1854d:718 (*Tettigonia*). Colombia, Venezuela.
sanguinosa (Walker), 1858a:101 (*Scaris*). New synonymy.

KEY TO SPECIES OF *PARACATUA*

Forewing yellowish gray-translucent; length of male 10.7 mm or less
rubrolimbata (Signoret) (fig. 4)
Forewing opaque, black; length of male more than 11.0 mm
reichi (Signoret) (fig. 5)

3. Genus **AGUANA** Melichar

Figures 6, 7

Aguana Melichar, 1926a:280. Type-species: *Tettigonia imbricata* Signoret, by original designation and monotypy.

Length of male 10.2-13.2 mm, of female 11.1 mm.

Head moderately produced, median length of crown varying from slightly less than one-half to approximately six-tenths interocular width and from slightly less than three-tenths to four-tenths transocular width, anterior margin very broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly before a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, crown with middle of disk either transversely or longitudinally concave, lateral clypeal sutures (often obscure) extending onto crown and attaining ocelli; antennal ledges not protuberant in dorsal view, in lateral view with anterior margins obliquely rectilinear, clypeus slightly concave medially, muscle impression not very distinct, transclypeal suture distinct, clypellus slightly produced, pubescent or not, profile of its lower portion at an angle to contour of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins as in *Neiva* Melichar, dorsopleural carina distinct but not extending as far anteriorly as eye margin, posterior margin slightly concave, disk with a pair of broad shallow depressions on anterior half, surface rugose; scutellum transversely striate behind transverse sulcus. Forewing with only inner apical cell membranous, veins elevated and distinct, without an anteapical plexus of veins but occasionally with a few supernumerary crossveins, with four or five apical cells, the base of fourth more proximal than base of third, texture as in *Neiva*; hindwings as in *Neiva*. Hindlegs with setae of row 2 sparsely set with intercalary multiseriate smaller setae, otherwise as in *Neiva*.

Male genitalia: Pygofer moderately produced, posterior margin varying from subangulate to broadly rounded, with numerous irregularly-distributed small macrosetae, with an apical process on each side. Plates slender, triangular, extending posteriorly to a variable degree with reference to apex of pygofer. Style without a preapical lobe. Connective Y-shaped. Aedeagus symmetrical, shaft slender, tapering apically, with paired apical processes. Paraphyses paired, usually symmetrical.

FIGURE 6. — *Aguana imbricata* (Signoret) (*a-h*, *p*, from specimen from São Paulo, Brazil; *q* from Brazil; *i*, *j*, from Santos, Brazil): *p*, Pygofer apex, right side, from ventral view; *q*, pygofer apex, left side, from ventral view.

Female abdominal sternum VII with a narrow median notched posterior projection. Genital chamber without sclerotization in dorsal membrane. Ovipositor with second valvulae as in *Ortega truncatipennis* (Signoret) (fig. 8, *k, m, n*). Pygofer with diagonal broad group of macrosetae parallel to posteroventral margin.

Specimens belonging to the genus *Aguana* Melichar have been studied only from southeastern Brazil. *Aguana* species are rare in collections, and the above description has been based on seven specimens, only one of which was a female.

Aguana is clearly related to *Ortega* Melichar, from which it may be distinguished readily by the presence of paraphyses and apical aedeagal processes in the male and the more produced apical margin of sternum VII of the female, all of which differ from *Ortega*.

The male genitalia of the holotype of *Tettigonia sanguinans* Walker agree with the illustrations of the Signoret-determined specimen of *A. imbricata* (Signoret) published here.

SPECIES OF *AGUANA*

imbricata (Signoret), 1854d:719. (*Tettigonia*). SE. Brazil.
sanguinans (Walker), 1858b:212 (*Tettigonia*). New synonymy.
russata, n. sp., SE. Brazil.

KEY TO MALES OF *AGUANA*

Aedeagus with unbranched apical processes ..... *imbricata* (Signoret) (fig. 8*f*)
Aedeagus with branched apical processes ..... *russata*, n. sp.

Aguana russata, NEW SPECIES

FIGURE 7

Length of male 11.3-13.2 mm. Head with disk of crown longitudinally concave, with an M-shaped elevation bordering posterior margin, antennal ledges not carinate dorsally. Male pygofer with posterior margin broadly convex, pygofer process slender, slightly curved subapically, disk with a few macrosetae near middle of posterior half and another group parallel to ventral margin; plates extending almost as far posteriorly as pygofer apex in macerated specimens; style extending posteriorly farther than apex of connective; aedeagus narrowed somewhat abruptly anteapically in lateral view, with slender paired apical processes each of which is once-branched; paraphyses slender, almost straight, slightly divergent. Other structural characters of male as in generic description.

Color of crown, pronotum, and forewings black, heavily spotted and vermiculate with dull, dark red. Forewings with a conspicuous yellow spot in corium opposite midlength of brachial cell, broadly and irregularly bordered with black, with an oblique dark reddish marking extending from outer anteapical cell posterolaterally to wing margin, broadly and irregularly bordered with black. Face black, heavily and variably marked with dull yellow or red. Propleura black lightly marked with yellow or red. Legs black.

Holotype male, "Ribeirão" [Ribeira] Pires, São Paulo, Brazil (E. Gounelle), November, 1898 (MMB), and two additional male specimens, both from São Paulo (MMB and IZP).

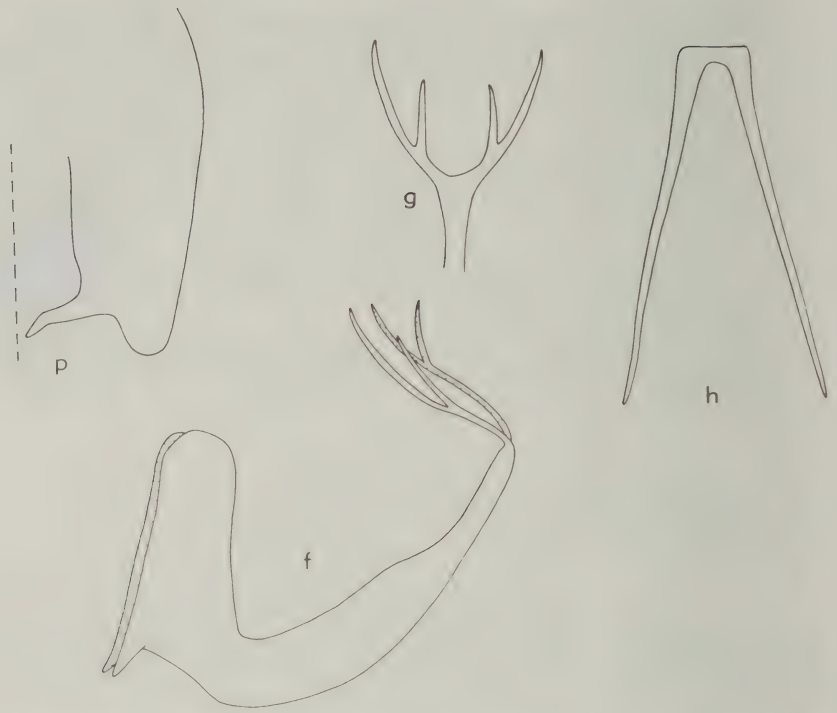


FIGURE 7. — *Aguana russata*, n. sp. (only apex of aedeagus shown in *g*): *p*, Male pygofer apex, left side, from ventral view.

Aguana russata, n. sp. is close to *A. imbricata* (Signoret), with which it has been confused both by Melichar and Schmidt. It differs from the Signoret species in its larger size, its deeper red markings, in the shape of the pygofer process and of the apical processes of the aedeagus.

4. Genus **ORTEGA** Melichar

Figure 8

Ortega Melichar, 1926a:280. Type-species: *Tettigonia truncatipennis* Signoret (=*Scaris obliqua* Walker, preoccupied), by original designation and monotypy.

Length of male 11.1 mm.

Head only slightly produced, median length of crown one-half interocular width and slightly less than one-third transocular width, anterior margin very broadly rounded in dorsal view, ocelli located behind a line between anterior eye angles, each closer to median line than to adjacent anterior eye angle, crown concave between ocelli; antennal ledges not protuberant in dorsal view, without carinae, in lateral view with anterior margins obliquely convex; clypeus flattened

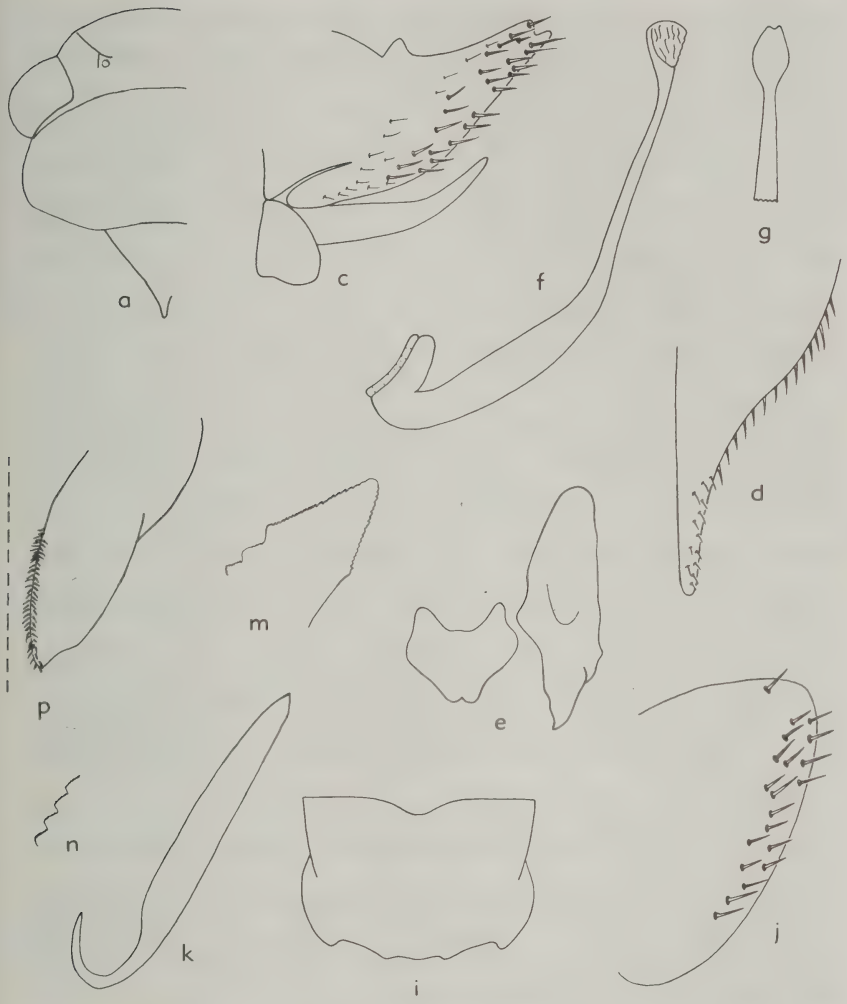


FIGURE 8.—*Ortega truncatipennis* (Signoret) (specimens from Colombia; only apex of aedeagus shown in *g*): *p*, Apex of male pygofer, left side, from ventral view.

medially, muscle impressions not very distinct. Other head characters as in *Neiva* Melichar.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carina distinct but not extending forward to eye margin, posterior margin slightly concave, disk transversely rugose and pubescent; scutellum not strongly convex behind transverse sulcus, transversely striate. Forewing without a membrane, veins obscure, not elevated, without an anteapical plexus of veins, with four very short apical cells, the base of fourth

more proximal than base of third, otherwise as in *Neiva*; hindwing greatly reduced in size but with vein R_{2+3} entire. Hindleg with intercalary setae between large setae of tibial row 2; length of first tarsomere approximately equal to combined length of two more distal tarsomeres; otherwise as in *Neiva*.

Male genitalia: Pygofer strongly produced and narrowed apically, with numerous mixed macro- and microsetae on posterior half and ventrally near base; ventral margin with numerous close-set microsetae on apical portion. Plates triangular, not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae along lateral margin almost to apex and with apical multiseriate microsetae. Style very short, not extending posteriorly much beyond apex of connective, without a distinct preapical lobe. Connective very short, somewhat Y-shaped, without a median keel. Aedeagus symmetrical, elongate, slender, gradually tapered in apical half to expanded apex, without processes. Paraphyses absent.

Female abdominal sternum VII with posterior margin not strongly produced, with a weak rounded lobe on each side of broad median slightly convex portion. Genital chamber with dorsal membrane lacking sclerotization. Ovipositor with second valvula broad beyond basal curvature, its ventral margin not convex, with somewhat convex primary teeth on dorsal margin, each with minute secondaries, with a number of anteapical minute teeth on dorsal and apicoventral margins, apex acute. Pygofer with a narrow group of setae parallel to posterior margin.

The genus *Ortega* Melichar is closer to *Aguana* Melichar than to the other genera discussed in the above treatment of *Neiva* Melichar, in lacking an anteapical plexus in the forewing, and in having macrosetae on the male plates. It differs from all of the other genera in the *Neiva* group in not having paraphyses in the males.

Three specimens of the type-species, one male each in NMV and BM (holotype) and one female (NCS) have been seen by the writer, all from Colombia.

The restoration of the secondary homonym *obliqua* (Walker) for the type-species of *Ortega*, in the Metcalf catalogue (1965:604), an action taken before the present rules were available, doesn't conform to Article 59(c) of the International Rules and is therefore not followed here.

SPECIES OF *ORTEGA*

truncatipennis (Signoret), 1854d:717 (*Tettigonia*) (new name). Colombia.
obliqua (Walker), 1851b:833 (*Scaris*) (preoccupied).

5. Genus **AGROSOMA** Medler

FIGURES 9-12

Agrosoma Medler, 1960a:19. Type-species: *Tettigonia pulchella* Guérin, by original designation.

Length 7.6-8.5 mm.

Head moderately produced, its median length approximately two-thirds interocular width and usually less than one-third transocular width, anterior

margin broadly rounded in dorsal view, in lateral view without a carina at transition from crown to face, ocelli located slightly behind a line between anterior eye angles, each about equidistant from median line and adjacent eye angle, disk slightly convex, without sculpturing or setae, lateral clypeal sutures extending onto crown and nearly or completely attaining ocelli; antennal ledges with anterior margins convex in lateral view; face convex, muscle impressions distinct, with weak sparse pubescence on lower portion, transclypeal suture obscure.

Thorax with pronotal width greater than transocular width of head, lateral margins divergent posteriorly, with complete rectilinear oblique dorsopleural carinae, hind margin concave, disk usually without sculpturing, occasionally finely rugulose, without pubescence; scutellum transversely striate behind transverse sulcus. Forewing with membrane including all of inner and part of remaining apical cells, veins often indistinct, with four apical cells, base of fourth more proximal than base of third, without a plexus of veins, texture coriaceous, without sculpturing; female with wings at rest exceeding apex of ovipositor. Hindwing with vein R_{2+3} rarely entire. Hindleg with femoral setal formula usually 2:1:1, occasionally 2:1:0 or 2:1:1:1; first tarsomere with length greater than combined length of second and third tarsomeres.

Male pygofer moderately produced and rounded apically, without or with only a few macrosetae interspersed among the microsetae which are located posterodorsally on disk, with or without processes, arising on ventral margin when present. Plates triangular, separate throughout their length, extending posteriorly as far as or slightly farther than pygofer apex, each with numerous microsetae not arranged in special pattern. Style extending posteriorly much beyond apex of connective, without preapical lobe, usually not strongly modified apically (exception: *A. proxima* (Signoret) *sens.* Medler). Connective Y-shaped with arms widely divergent, stem keeled. Aedeagus symmetrical, variable interspecifically in shape, with paired processes on shaft. Paraphyses absent.

Female abdominal sternum VII with middle portion of posterior margin produced in a lobe which is carinate medially and excised apically. Second valvulae of ovipositor narrow, and fused dorsally and without teeth in basal two-thirds, apical third slightly broader and with minute teeth on dorsal surface.

Species of *Agrosoma* occur from Mexico to Venezuela and Colombia. Species are usually brick red, variously marked with black and yellow or white. Medler (1960a) erected this genus, placing it near *Hordnia* Oman which I have synonymized under *Graphocephala* Van Duzee (p. 849), a relationship that probably isn't very close. The female sternum VII and second valvulae are similar to *Trichogonia* Breddin, but the pygofer lacks the lateroventral emargination found in that genus and its closer relatives. I have placed it in the *Trichogonia* (see below) generic group.

There is a considerable amount of variation in the male genitalia which was not mentioned in Medler's work. In *A. akenalis* Medler, there is often a short but distinct process on the ventral pygofer margin, and in some specimens the anteapical processes of the aedeagal shaft are wanting (figs. 9*p*, 9*f*). The more basal pair of the aedeagal processes of *A. cruciata* (Signoret) are also somewhat variable.

Medler's selection of a neotype of *A. pulchella* (Guérin) is invalid, according to the International Rules, with the result that the type-species is presently without a type-specimen.

Species of *Agrosoma* have been collected from a number of economic plants, including Cacao, beans, sunflower, *Lantana camara* L., and Kudzu (Medler, *op. cit.*), and the present writer has identified *A. bispinella* Medler from potato in the USNM.

Because Medler's revision is recent and readily available, no key is published here, and only those illustrations needed for the new species described below, and those referred to above are included.

SPECIES OF *AGROSOMA*

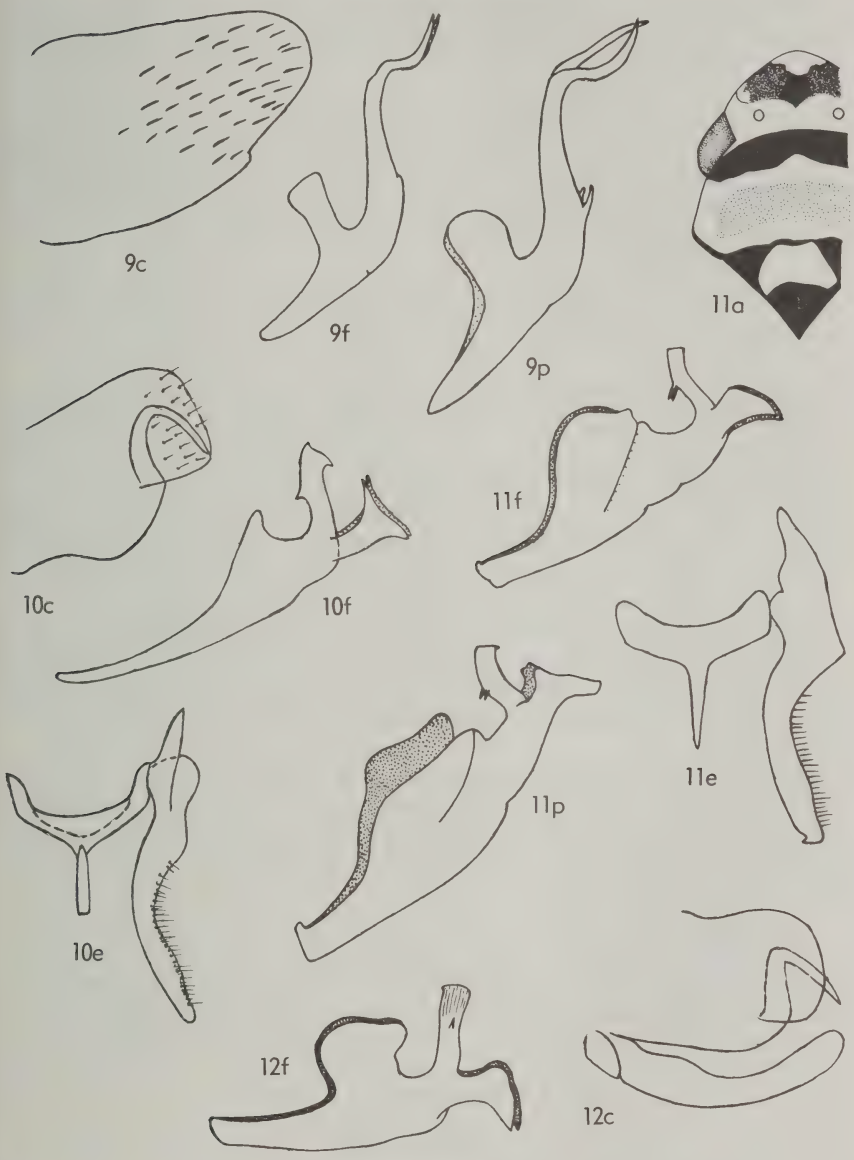
akenalis Medler, 1960a:22. Mexico, Guatemala.
bispinella Medler, 1960a:25. Mexico, Guatemala, Honduras, El Salvador, Costa Rica.
carinona Medler, 1960a:22. Guatemala, B. Honduras, Honduras.
cruciata (Signoret), 1853b:361 (*Tettigonia*). Costa Rica, Panama, Colombia, Venezuela, Ecuador.
decepta Medler, 1960a:24. Mexico.
exukanis Medler, 1960a:24. Mexico.
glyphalis Medler, 1960a:24. Mexico.
iluha, n. sp., Colombia.
nabima, n. sp., Ecuador.
placetis Medler, 1960a:24. Costa Rica, Guatemala, Nicaragua, Panama.
proxima (Signoret), 1853b:361 (*Tettigonia*). Guatemala, Honduras.
pulchella (Guérin), 1829a: pl. 59, fig. 10 (*Tettigonia*). Mexico.
syklis Medler, 1960a:22. Mexico.
terebra Medler, 1960a:24. Mexico.

Agrosoma iluha, NEW SPECIES

FIGURE 11

Length of male 7.4-8.0 mm, of female 8.2-8.5 mm. Head with median length varying from less than one-third to slightly more than one-third transocular width. Forewing with veins indistinct. Male pygofer with process much as in *A. cruciata* (Signoret), in form of an inverted "U" in lateral view, the apex not extending beyond pygofer margin; style long, slightly hooked at apex; aedeagus as in *cruciata* (Signoret) but with the ventral pair of processes lacking the anterior point of the Signoret species, and tapered rather than expanded apically, the more dorsal pair of aedeagal processes more slender and acute and the preatrium much shorter than in *cruciata*. Other structural characters as in generic description.

Ground color of head and pronotum yellow, a U-shaped marking at apex of crown, an arcuate band on anterior pronotal margin and humeral margins narrowly, black, pronotal disk variably suffused with red or black; scutellum black with a median semicircular yellow spot on basal half; forewings much as in Medler's (1960a:23, fig. 12) illustration of forewing of *cruciata* but with the midcorial black area more reduced.



FIGURES 9-12.—9, *Agrosoma akenalis* Medler (*f* from specimen from Vera Cruz, Mexico; *c* and *p*, from Orizaba, Mexico; male plate not shown in *c*): *p*, Aedeagus from lateral view. 10, *A. cruciata* (Signoret) (specimen from Ancón, Panama C. Z.; plate not shown in *c*). 11, *A. iluha*, n. sp. (*a* and *p*, specimen from Colombia; *e* and *f*, from holotype): *p*, Aedeagus from lateral view. 12, *A. nabima*, n. sp., holotype.

Holotype male from Chaco, Bogotá, Colombia, August 11, 1940 (L. Richter) on indefinite loan to USNM from NCS. Additional specimens have been seen from "Bucaramanga" and "Carare", Colombia and with labels merely "Colombia".

Agrosoma iluha, n. sp., is closely related to *A. cruciata* (Signoret) from which it can be distinguished by the aedeagal characters mentioned above. It is also closely related to *A. nabima,* n. sp., from which it can be distinguished by the aedeagal characters mentioned in the following description and by the black posterior border of the pronotum in *nabima.*

Agrosoma nabima, NEW SPECIES

FIGURE 12

Length 8.1-8.7 mm. Head with median length one-third or less transocular width. Forewing with veins indistinct. Male pygofer with process much as in *A. cruciata* (Signoret), in the form of an inverted "V" in lateral view, but with apex extending beyond pygofer margin; aedeagus as in *A. iluha,* n. sp., but with more apical pair of processes greatly reduced and located laterally on shaft and with more ventral pair of processes rounded dorsally but longer and more narrowed anteapically than specimens of *iluha* which have processes so rounded; preatrium as in *iluha.* Other structural characters as in generic description.

Color of head and pronotum much as in *iluha* but with posterior margin of pronotum fairly broadly bordered with black throughout its extent. Forewing with pattern variable, the hindmost red area often completely encircled in white, the diameter of the circle being greater than shown in any of Medler's (1960) illustrations.

Holotype male, Balzapamba, Ecuador, 700 m., 28 May, 1938 (W. Clark-Macintyre) on indefinite loan to UNSM from NCS. Additional specimens from Cojimies, Manabi; Pucay Uacu, Los Ríos; Santo Domingo; road between Quito and Santo Domingo; nr. Riobamba, Chimborazo; Linje, Baños, and Chimbo, all in Ecuador.

A. nabima, n. sp., is closely related to *A. iluha,* n. sp., and to *A. cruciata* (Signoret). It differs in that the pygofer process extends beyond the pygofer margin in lateral view, in the characters of the aedeagus mentioned in the above description and in the black band across the hind pronotal margin.

6. TAHUAMPA, NEW GENUS

FIGURES 13, 14

Type-species: *Tettigonia septemfasciata* Signoret.

Length 11.5-12.5 mm.

Head moderately produced, median length of crown approximately one-half interocular width and approximately one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each approximately equidistant from latter and median line, crown convex, without a

transverse concavity, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown but not attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins rectilinear and oblique; clypeus slightly flattened medially, muscle impressions distinct, without pubescence, transclypeal suture obsolete medially, clypellus weakly and obtusely subangulate in profile, weakly pubescent.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin weakly concave, disk weakly rugulose or not, not pubescent; scutellum not striate behind transverse sulcus. Forewing with only inner apical cell membranous, veins elevated and distinct, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of second and third tarsomeres, with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin broadly convex, with a number of macrosetae on posterior and posteroventral portions of disk and a group of more closely spaced macrosetae near middle of disk; plates short, abruptly narrowed at or beyond midlength, not extending posteriorly as far as pygofer apex, with multiseriate macrosetae and with a number of elongate microsetae on lateral margins; style extending posteriorly farther than apex of connective, without a preapical lobe; connective narrowly Y-shaped, with arms not widely divergent, strongly keeled; aedeagus simple, broadened apically, without processes or with inconspicuous ventral processes near base of shaft. Paraphyses present, slightly decurved in apical half.

Female abdominal sternum VII elongate, abruptly narrowed in apical one-fourth to a narrow median truncate lobe. Dorsal membrane of genital chamber with a pair of poorly delimited sclerotized areas. Ovipositor with second valvulae slender, with few poorly developed teeth on dorsal surface in apical one-fourth. Pygofer with short macrosetae, unevenly distributed on apical half of disk (female of type-species unknown).

Specimens of *Tahuampa* are known from Venezuela and Peru. I have placed *Tahuampa*, new genus, near *Agrosoma* Medler, chiefly because of the similarity of the female second valvulae and the multiseriate male plates. The produced female sternum VII suggests a relationship to the *Trichogonia* Breddin generic group (see below), but the lateroventral emargination of the female pygofer is lacking.

The lectotype of *Tettigonia septemfasciata* Signoret agrees with the illustrations published here.

SPECIES OF *TAHUAMPA*

desmotis, n. sp. N. Peru.

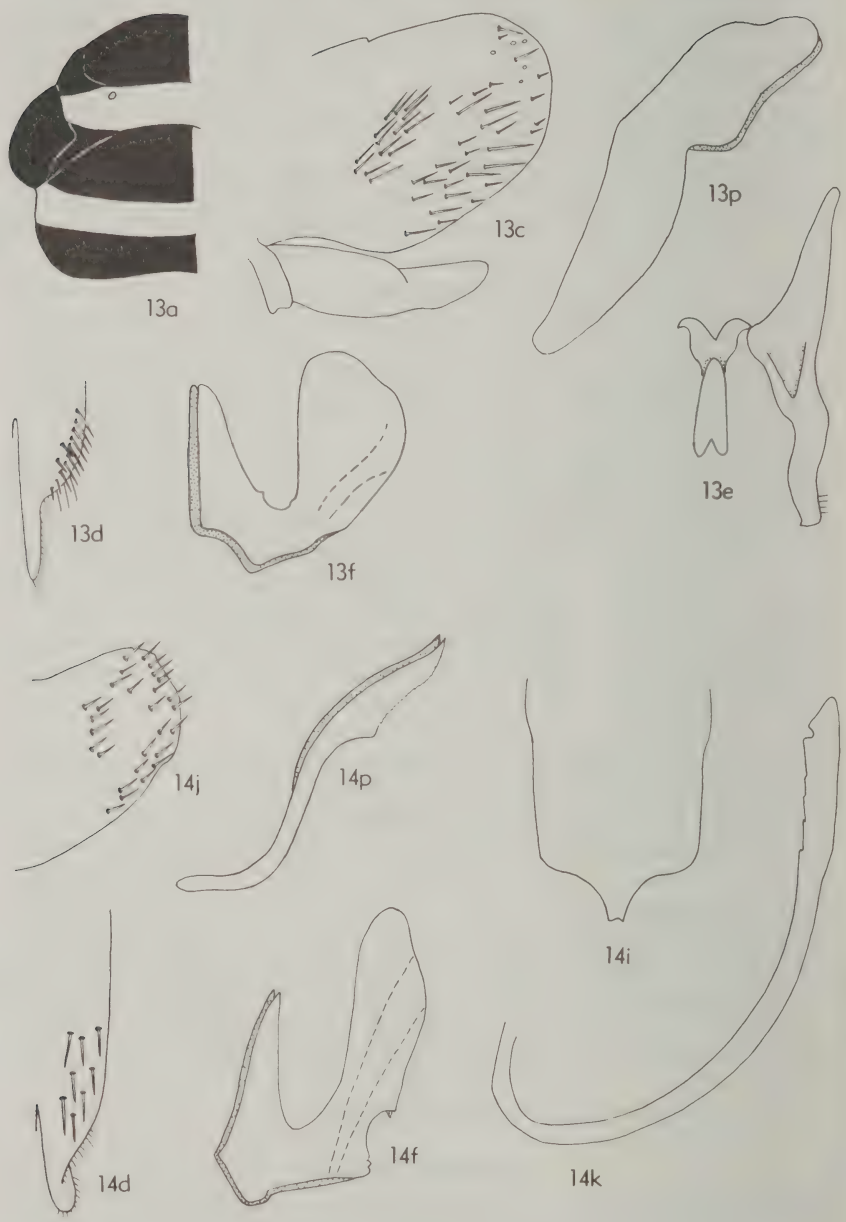
septemfasciata (Signoret), 1853b:332 (*Tettigonia*). Venezuela. New combination.

KEY TO SPECIES OF *TAHUAMPA*

Forewings at rest with two narrow transverse orange bands in addition to the broader sordid white transverse bands .... *septemfasciata* (Signoret) (fig. 13)

Forewings at rest with broad sordid white bands only

desmotis, n. sp., page 49



FIGURES 13, 14.—13, *Tahuampa septemfasciata* (Signoret) (from specimen from El Valle, Venezuela): *p*, Paraphyses from lateral view. 14, *T. desmotis*, n. sp. (holotype male and female topotype): *p*, Paraphyses from lateral view.

Tahuampa desmotis, NEW SPECIES

FIGURE 14

Length of male 11.5-12.0 mm. External structural characters as in generic description. Male genitalia: Plates in ventral view abruptly narrowed anteapically; aedeagus with shaft longer and not as broad as in *T. septemfasciata* (Signoret), and with a pair of small angular processes on posterior margin near base; paraphyses curved through slightly less than 90° near base, the arms curved slightly ventrally and angulate near midlength of their ventral margins, each acute at apex. Other genital characters as in *septemfasciata* (fig. 13). Female abdominal sternum VII as in generic description.

Color of dorsum black, a broad stripe across posterior portion of crown between eyes, a slightly arcuate stripe across pronotum, and four broad transcommissural stripes extending from costal margin to costal margin across forewings at rest, the first involving apical half of scutellum, the second across midclavus, the third nearly at claval apex, the fourth from costal margin across anteapical cells to inner apical cell, dull yellowish-gray. Face and pleura dull yellow, a broad transverse stripe at base and before apex of clypeus, median apical portion of clypellus and apical portions of legs, black.

Holotype male, Río Santiago, Peru, August 28, 1924, and female topotype, October 1, 1924 (AMNH).

T. desmotis, n. sp., is closely related to *septemfasciata* from which it may be distinguished readily by the color characters in the above key. It differs also in the aedeagus, as described above, and in the paraphyses which are much more slender than in *septemfasciata*.

7. GENUS **TRICHOGONIA** BREDDIN

FIGURES 15-20

Trichogonia Breddin, 1901c:75. Type-species: *Trichogonia ardentula* Breddin, by original designation.

Length 8.3-10.4 mm.

Head weakly produced, with median length from slightly more than four-tenths to two-thirds interocular width and from one-third to almost four-tenths transocular width, anterior margin broadly rounded in dorsal view, with a complete carina separating crown from face, ocelli located on or slightly behind a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, disk of crown concave, often with an indistinctly delimited elevation behind each ocellus, with regularly arranged fine pubescence (specimens often rubbed), lateral clypeal sutures not extending onto crown; antennal ledges protuberant in dorsal aspect, in lateral aspect with their anterior margins vertical or slightly oblique; face with clypeus convex, finely pubescent, muscle impressions distinct, transclypeal suture obscure.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae oblique and usually complete, hind margin concave, disk transversely rugose, uniformly finely pubescent; scutellum transversely rugose on posterior half. Forewing with membrane

usually present and variable interspecifically in extent, veins elevated and distinct, with four apical cells, the inner apical cell very narrow, fourth apical cell either sessile or petiolate, its base slightly or greatly more proximal than base of third apical cell, texture usually coriaceous except for membrane and with fine close-set pubescence; forewings of female in rest position exceeding apex of ovipositor. Hindleg in rest position with knees not attaining posterior proepimeral margin; femoral setal formula 2:0:0, first tarsomere with length usually greater than combined length of second and third tarsomeres, with setae of plantar surface of first tarsomere either irregularly arranged or in longitudinal rows.

Male genitalia: Pygofer not strongly produced posteriorly, with numerous dispersed microsetae (often not visible on disk), and with fewer macrosetae, without processes. Plates subtriangular, abruptly narrowed at base of apical third, separate throughout their length, extending posteriorly as far as or farther than pygofer apex, with numerous irregularly arranged microsetae. Style extending much farther posteriorly than apex of connective, without preapical lobe, apex directed ventrally and subacute. Connective Y-shaped with arms widely divergent, or triangular, with a strong median keel. Aedeagus symmetrical, in lateral aspect somewhat U-shaped, articulated with connective, without processes, genital orifice anteapical and ventral. Paraphyses paired, short, and acute; occasionally apparently not joined at their bases.

Female abdominal sternum VII strongly produced, with posterior margin acute medially. Ovipositor second valvulae each with a few (6-9) rounded weak primary teeth on dorsal margin in apical third, without secondary denticles, apex subacute, with minute regular denticles on apicoventral margin.

The range of *Trichogonia* is from Ecuador to Bolivia. At the time I visited Europe, because the male genitalia of the nominate species were closely similar, I considered all of them synonymous. Subsequent examinations of a number of specimens yielded little intergradation in color to support this assumption, and older authors are followed in considering them good species, but many more collections are desirable to test the accuracy of this. Following this course has led to the omission of *T. intermedia* Schmidt from the following key, because no specimens were availabe for comparison, and to the description of a new species, below.

Trichogonia Breddin is related to *Stehlikiana*, new genus, in the structure of both male and female genitalia, but in female *Trichogonia* there are no macrosetae on the female pygofer, and the microsetae extend farther onto the disk. In the males, the genital orifice is terminal in *Stehlikiana* instead of anteapical as in *Trichogonia*. Although I have not seen females of *Cephalogonalia* Evans, it is undoubtedly closely related to both of the above genera. In *Trichogonia*, vein R_{2+3} is obsolete in the hindwing, in contrast to *Cephalogonalia* and *Stehlikiana* (except *S. crassa* (Walker)). Similarities in the female genitalia of *Trichogonia* and *Stehlikiana* to *Graphocephala nigrifascia* (Walker) are probably indicative of a relationship to the *Graphocephala* generic group.

It should be noted that although many specimens of *Trichogonia* are easily recognized by their dense pubescence, a number of museum specimens have apparently been rubbed nearly smooth. In these the pubescence is nearly always apparent on the genae beneath the eyes and on the proepimera.

I have examined the lectotype of *Trichogonia ardentula* Breddin. I have not seen type material of *T. areata* Melichar. The lectotype of *T. boliviana* Distant has been studied.

No specimens of *Tettigonia costata* Signoret eligible to be lectotype were found in the collections at Vienna, or in MHNP. Both museums had specimens from Bolivia, those in Vienna with Signoret's determination labels, but the original description gave "La Guayra" [Venezuela] as the type locality.

I have studied the lectotype of *Tettigonia duplicaria* Distant. The only specimen of *Trichogonia intermedia* Schmidt I have been able to identify is the lectotype, in Warsaw, hence this species has not been included in the key (below). I have examined the lectotype of *T. isabellula* Breddin.

TRICHOGONIA GENERIC GROUP

5. Agrosoma

6. Tahuampa

10. Uperogonalia

7. Trichogonia

8. Cephalagonalia

9. Stehlikiana 11. Parinaeota

SPECIES OF *TRICHOGONIA*

ardentula Breddin, 1901c:75. Ecuador.
areata Melichar, 1926a:329. Peru.
boliviana Distant, 1908a:515. Bolivia.
costata (Signoret), 1853b:372 (*Tettigonia*). Peru, Bolivia.
duplicaria (Distant), 1891d:120 (*Tettigonia*). Ecuador.
intermedia Schmidt, 1928a:52. Ecuador.
isabellula Breddin, 1901c:75. Ecuador.
vittata, n. sp. Colombia.

KEY TO SPECIES OF *TRICHOGONIA*

(*T. intermedia* Schmidt and *T. areata* Melichar not included)

1. Forewings dull red with a black apical band ... *ardentula* Breddin (fig. 16)
   Forewings colored otherwise 2

2. Anterior dorsum tan with black markings 3
   Anterior dorsum black except for median pale marking on crown of head 4

3. Pronotum with black longitudinal stripes and forewings with black diagonal vittae ..... *vittata*, n. sp., page 52
   Pronotum with black spots, forewings not as above
   isabellula Breddin (fig. 18)

4. Forewing with inner apical cell coriaceous
costata (Signoret) (fig. 15)
Forewing with inner apical cell hyaline or translucent yellow 5

5. Forewing with second apical cell partly darkened, without a pale area in clavus ..... *boliviana* Distant (fig. 19)
Forewing with second apical cell and adjoining apex of anteapical cell hyaline or translucent yellow, with a pale area in clavus
duplicaria Distant (fig. 20)

Trichogonia vittata, NEW SPECIES

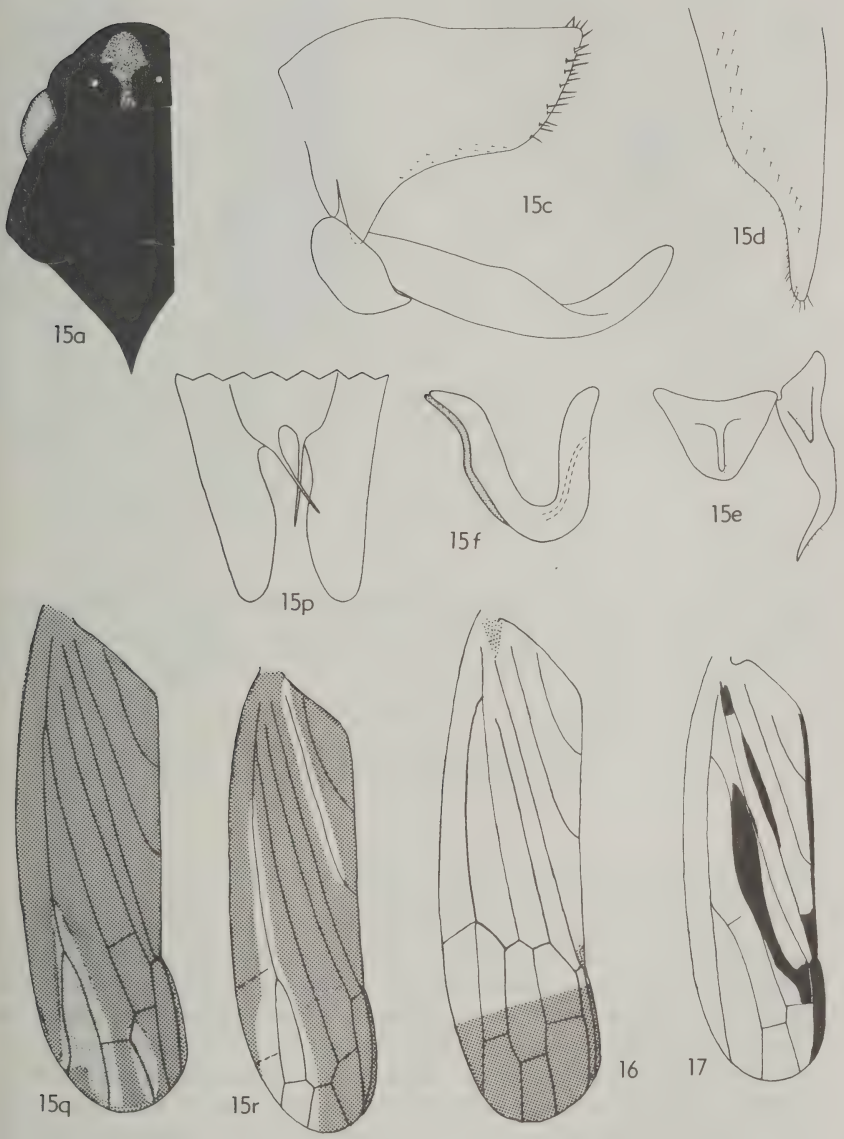
FIGURE 17

Length of male 8.7 mm, of female 8.3-8.6 mm. Head of male with median length from six-tenths to three quarters interocular width and from slightly more than one-third to more than four-tenths transocular width, median length of head of female from slightly less than one-half to six-tenths interocular width and from less than one-third to slightly less than four-tenths transocular width, ocelli located on a line between anterior eye angles, antennal ledges in lateral aspect without a longitudinal fovea, carinate dorsally, each with anterior margin slightly oblique. Thorax with dorsopleural carinae oblique and complete. Forewing subhyaline with dark areas as described below, fourth apical cell petiolate, its base much more proximal than base of third apical cell; first posterior tarsomere with length greater than combined length of second and third tarsomeres, microsetae on its ventral surface arranged in two longitudinal rows, with additional finer microsetae between and above the rows. Female with second valvulae of ovipositor with approximately nine weak rounded teeth on apical third of dorsal margin. Other structural characters as in generic description.

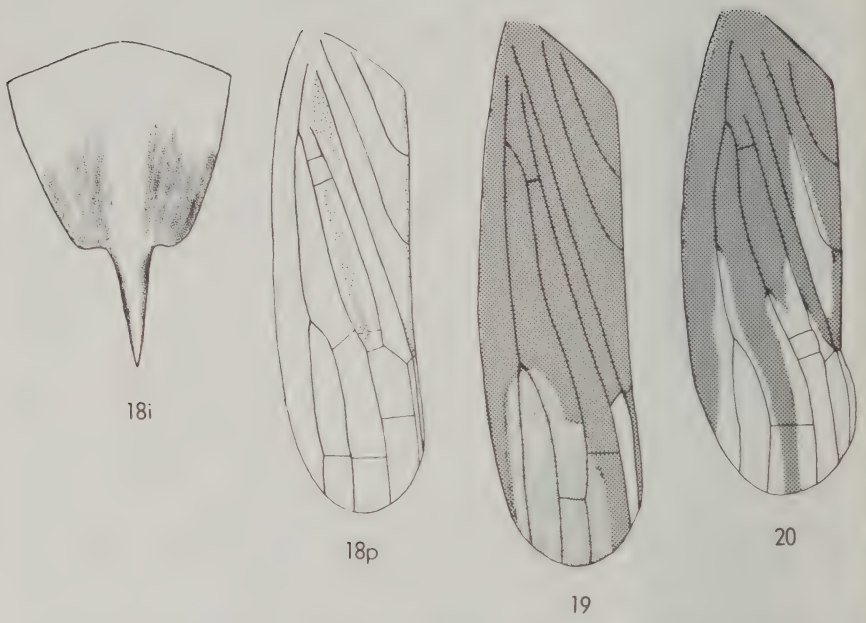
Color of dorsum sordid yellow to tan, the wings translucent tan, crown of head with a pair of longitudinal stripes through ocelli (occasionally interrupted), anterior margin, a pair of irregular longitudinal stripes across disk and one on each lateral margin of pronotum, basal angles and apex of scutellum, commissural margins, claval apex, a vitta of variable extent along claval suture, costal, apical, and mesal margins of corium narrowly, a diagonal discal marking (occasionally joined to commissural margin beyond apex of clavus) of forewings, black; venter tan with at least apex of clypellus black. One male specimen lacks the paired vittae of the crown and has a median vitta instead; it also has the vittae of the forewings broken into irregular spots.

Holotype female, Bogotá, Colombia (L. Richter), four additional females and two males, same data (NCS). Holotype on indefinite loan to UNSM.

T. vittata, n. sp., differs from other species of the genus in color and can be distinguished by the characters used in the key, above.



FIGURES 15-17.—15, *Trichogonia costata* (Signoret) (*a-p*, from specimen from Churubamba, Peru; *q*, *r*, from Cuzco, Peru): *p*, Male pygofer apex from ventral view; *q*, *r*, forewings of two specimens. 16, *T. ardentula* Breddin (from specimen from Baños, Ecuador), forewing. 17, *T. vittata*, n. sp. (from specimen from Bogotá, Colombia), forewing.



FIGURES 18-20.—18, *Trichogonia isabellula* Breddin (from specimens from Ecuador): *p*, Forewing. 19, *T. boliviana* Distant (from specimen from Ecuador), forewing. 20, *T. duplicaria* (Distant) (from specimen from Ecuador), forewing.

8. UPEROGONALIA, NEW GENUS

FIGURE 21

Type-species: *Uperogonalia reducta,* n. sp.

Length of male 6.8 mm, of female 5.9-6.0 mm.

Head moderately produced, with median length of crown from two-thirds to slightly more than seven-tenths interocular width and from slightly less than four-tenths to slightly more than four-tenths transocular width, anterior margin right-angled at apex, ocelli located behind a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, disk with a median and two lateral concavities separated by the elevated ocelli (the median concavity rarely divided by a longitudinal carina), surface of median concavity irregularly rugose, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant in dorsal aspect, in lateral aspect with anterior margins rectilinear and slightly oblique; face with clypeus convex, muscle impressions distinct, transclypeal suture obscure, profile of clypellus continuing contour of clypeus, with fine pubescence on genae, lora, and apex of clypellus.

Thorax with pronotal width equal to (male) or less than (female) transocular width of head, lateral margins convergent (male) anteriorly or parallel, dorsopleural carinae oblique and complete, posterior margin angularly concave, disk

obscurely transversely rugose, without pubescence; scutellum usually transversely rugose behind transverse sulcus. Forewing brachypterous in females, without a membrane, veins distinct in males, very obscure in females, males with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous, without pubescence; forewings of female in rest position not exceeding apex of ovipositor. Hindleg in rest position with knees attaining posterior proepimeral margins (male) or not (female), femoral setal formula 2:1:0, tibiae with macrosetae of rows 1 and 2 widely spaced, with fine setae intercalated in the rows and also located elsewhere on the tibae, first tarsomere with length equal to combined length of two more distal tarsomeres, setae of plantar surface either irregularly arranged or in two longitudinal rows.

Male genitalia: Pygofer as in *Trichogonia* Breddin. Plates triangular, extending posteriorly as far as pygofer apex, with multiseriate macrosetae. Style extending posteriorly beyond apex of connective, without a preapical lobe, acute apically; connective broadly V-shaped; aedeagus symmetrical, in lateral aspect somewhat U-shaped, with basal apodemes approximately as long as shaft, processes absent. Paraphyses absent.

Female abdominal sternum VII strongly produced and acutangular at apex, with a blunter angle on each lateral margin at its midlength. Ovipositor with second valvula toothed only on apical third of dorsal margin beyond basal curvature, the teeth few and each with small secondary denticles, with anteapical denticles on posterodorsal and posteroventral margins. Pygofer with numerous macrosetae on posterior two-thirds of surface, with a deep emargination on posteroventral margin.

Uperogonalia, new genus, known only from the type-species from Peru, is similar to *Trichogonia* in several features of both males and females (figs. 15 and 18), and is probably closely related to *Trichogonia*.

Uperogonalia reducta, NEW SPECIES

FIGURE 21

Structural characters as in generic description. Male with ground color of crown, pronotum, and scutellum, sordid brown, variably marked with black, with or without (holotype) a median black stripe on apical portion of crown, with a few irregular black markings parallel to anterior margin of pronotum, and a dark brown wide band bordering posterior margin of pronotum and with angular anterior extensions to disk of pronotum; scutellum with a spot in each basal angle, and apex, black, with or without (holotype) an additional round black spot on each side of median line in basal half; forewings brownish translucent with apical veins and a few sectors of longitudinal veins before apical veins, dark brown; clypeus and clypellus black (holotype) or shining black, muscle impressions black; genae with or without (holotype) a dark spot below each antennal base; propleura pale with a dark spot below dorsopleural carina and adjoining eye; legs brownish with black spots at bases of hind tibial setae in rows 2, 3, and 4 and black setae in row 4. Female with a black spot at scutellar apex,

FIGURE 21.—*Uperogonalia reducta*, n. sp. (from specimens from Tarma, Peru).

remainder of anterior dorsum and forewings unmarked dull yellow; face and propleura concolorous with dorsum except dark muscle impressions on clypeus; legs as in male.

Holotype and three additional males and thirteen females, Tarma, Peru, August 1940 (NCS). Holotype on indefinite loan to USNM.

9. STEHLIKIANA, NEW GENUS

FIGURES 22-45

Type-species: *Tettigoniella halticula* Jacobi.

Length 7.1-11.1 mm.

Head only slightly produced, median length of crown from four-tenths to more than two-thirds interocular width, and from one-fourth to four-tenths (usually to one-third) transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, crown with a broad shallow concavity on

disk (exception: *S. torquata,* n. sp.) without sculpturing or setae, lateral clypeal sutures extending onto crown and usually attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins usually rectilinear and oblique; clypeus flattened, muscle impressions distinct or not (varying interspecifically), face occasionally with weak pubescence on its lower portion, transclypeal suture almost always interrupted at middle, clypellus not strongly produced, its profile variable interspecifically, either continuing profile of clypeus or with contour of its lower portion more nearly horizontal.

Thorax with pronotal width usually less than transocular width of head, lateral margins parallel or convergent anteriorly, dorsopleural carinae usually incomplete, posterior margin concave, disk usually without punctures or rugosity, not pubescent; scutellum transversely striate behind transverse sulcus or not. Forewing with or without a membrane, veins usually not very distinct, with four apical cells (not observed in *S. absona*, n. sp.) of which the base of the fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere interspecifically variable compared with combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, with posterior margin varying from regularly convex to obliquely truncate, with setae usually numerous and consisting entirely of microsetae or of microsetae mixed with macrosetae. Plates triangular and with numerous macrosetae usually not arranged in rows. Style extending posteriorly farther than apex of connective, without preapical lobe. Connective with basal arms widely divergent, remainder usually approximately triangular. Aedeagus symmetrical, shaft extending dorsally and without processes. Paraphyses varying from distinct to indistinct or absent, symmetrical when present and varying from a median structure without rami to an elongate unpaired basal portion and paired shorter rami.

Female abdominal sternum VII strongly keeled medially and with a strongly produced gradually tapered posterior triangular lobe that may be acute or slightly emarginate apically. Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvulae each of uniform narrow width throughout length, toothed portion of dorsal margin limited to apical one-third, consisting of small denticles over successive convexities basally, primary teeth quadrate and with denticles in more apical portion, with a number of anteapical dorsal and ventral denticles, apex narrowly rounded or acute; third valvulae very broad compared to width of second valvulae. Pygofer with posteroventral margin strongly emarginate, delimiting a large posterior lobe which bears macrosetae which are specifically variable.

This genus is named in honor of Dr. Jaroslav Stehlík, of the Moravske Museum in Brno, Czechoslovakia, who was most helpful during my visit there in 1962.

Species of *Stehlikiana*, new genus, occur in British Honduras, Venezuela, Colombia, Ecuador, Peru, Bolivia, and Brazil. *Stehlikiana* is related to *Trichogonia* Breddin in the treatment of which distinguishing characters are discussed.

It is difficult to get males of some species through the generic key, but the females are similar to *Trichogonia* and to *Mesogonia evansi* Young, but different from other Cicadellini.

A number of specimens of *Stehlikiana halticula* (Jacobi) were collected on grasses in Chanchamayo, near San Ramón, Peru, by Juan Salazar and Carlos Ramirez. Specimens of *S. crassa* (Walker) were collected on carrots by A. Unigarro, and on potatoes by M. Revelo in Pasto, Colombia.

My identification of *Tettigonia decorata* Walker is based on an examination of the female lectotype. Signoret renamed this species as a result of secondary homonymy when he moved his *Dilobopterus decoratus* (1850b:285) to *Tettigonia*. Distant (1908a:524) restored the Walker name because the secondary homonymy did not exist then, an action not in accord with Article 59 of the International Rules. The lectotype of *Tettigonia crassa* Walker, a specimen without an abdomen, has also been studied.

I have studied the female lectotype of *Tettigonia gryllula* Breddin (fig. 42) and the lectotype of *Tettigoniella halticula* Jacobi (fig. 45). The female lectotype of *Tettigonia latereula* Breddin agrees with the present interpretation of that species.

My interpretation of *Tettigonia medusa* Distant is based on an examination of the lectotype. I have not seen types of *Tettigonia novemnotata* Lethierry. Melichar's identification of this species, which agrees well with the original description, is followed here.

I have not seen specimens of the type-series of *Tettigonia mirabilis* Signoret. I have identified this species by comparisons of the series from Bogotá, Colombia (RMS) with the original illustrations. The male genitalia, not illustrated, are very close to those illustrated (fig. 24) for *Stehlikiana ramirezi*, n. sp.

My interpretation of *Tettigonia obsoleta* Signoret is based on a study of the male lectotype (fig. 35), a series of specimens of both sexes from Rancho Grande, Aragua, Venezuela, and specimens from Villavicencio, Colombia.

I have not seen a specimen eligible to be lectotype of *Tettigoniella obesula* Jacobi, but my identification agrees with a male from Rioja, Peru, in Jacobi's collection in Dresden, East Germany. I have seen only the female lectotype (fig. 43) of *Cardioscarta perspicua* Melichar.

My interpretation of *Cardioscarta perturbata* Melichar is based on a study of the lectotype, and a male topotype.

The illustrations of the abdominal sternum VII of the female were made from macerated specimens. The male genitalia of most of the species are so similar that they are not very useful as specific characters.

SPECIES OF *STEHLIKIANA*

absona, n. sp. Colombia.
bogotaensis, n. sp. Colombia.
burksorum, n. sp. Bolivia.
chola, n. sp. Peru.
coalita, n. sp. Ecuador.
crassa (Walker), 1851b:762 (*Tettigonia*). Ecuador, Colombia. New combination.
    decorata (Walker), 1851b:761 (*Tettigonia*).
    walkeri (Signoret), 1853b:362 (*Tettigonia*) (new name for *decorata* Walker, not Signoret 1850b:285).
    medusa (Distant), 1893a:95 (*Tettigonia*). New synonymy.

denotata, n. sp. Bolivia.
erratilis, n. sp. Peru, Bolivia.
forsteri, n. sp. Bolivia.
gaudialis, n. sp. Colombia.
gryllula (Breddin), 1901e:90 (*Tettigonia*). Ecuador. New combination.
guttata, n. sp. Colombia.
halticula (Jacobi), 1905c:176 (*Tettigoniella*). Peru. New combination.
latercula (Breddin), 1901e:90 (*Tettigonia*). Ecuador. New combination.
meridaensis, n. sp. Venezuela.
mirabilis (Signoret), 1853b:334 (*Tettigonia*). Colombia. New combination.
novemnotata (Lethierry), 1890a:158 (*Tettigonia*). Colombia, Venezuela. New combination.
obesula (Jacobi), 1905c:175 (*Tettigoniella*). Peru. New combination.
obsoleta (Signoret), 1854a:15 (*Tettigonia*). Venezuela. New combination.
perspicua (Melichar), 1932a:303 (*Cardioscarta*). Brazil. New combination.
perturbata (Melichar), 1932a:303 (*Cardioscarta*). Colombia. New combination.
ramirezi, n. sp. Peru.
reclusa, n. sp. Peru, Bolivia.
torquata, n. sp. Ecuador.

KEY TO SPECIES OF *STEHLIKIANA*

(*S. perspicua* Melichar not included)

1. Forewings subhyaline except for narrow dark costal, apical, and commissural margins, and at most with a small black spot near base of middle anteapical cell 2
   Forewings not as above 3

2. Forewings with a small black spot near base of middle anteapical cell; crown with only a single apical black spot
   bogotaensis, n. sp., page 61
   Forewings without such a spot; crown with a median discal black spot and additional dark markings ..... *denotata,* n. sp., page 61

3. Forewings orange, unmarked or with a narrow apical dark band only 4
   Forewings with markings more extensive 6

4. Head with a median black discal spot; pronotum unmarked
   ramirezi, n. sp., page 63
   Head with a pair of apical or postapical black spots; pronotum with some black markings 5

5. Pronotum with two discal dark spots or none (additional black pronotal markings may be present) ..... *latercula* (Breddin) (fig. 25)
   Pronotum with three discal black spots in a transverse row
   novemnotata (Lethierry) (fig. 26)

6. Clavus fumose with orange veins 7
   Clavus not as above 9

7. Forewings with a transverse black stripe through anteapical cells, bordered before and behind with yellow or orange
   erratilis, n. sp., page 64
   Forewings not as above 8

8. Face orange, unmarked ..... *burksorum*, n. sp., page 67
Face with muscle impressions and a median spot, black
forsteri, n. sp., page 67

9. Forewings with transverse dark bands 10
Forewings not so marked 13

10. Forewings at rest with at least one of the transverse bands attaining the claval commissural margin 12
Forewings at rest without a transverse band attaining the claval commissure 11

11. Face with a median clypeal band and apex of clypellus black
reclusa, n. sp., page 69
Face not marked with black ..... *absona*, n. sp., page 70

12. Pronotum with two longitudinal stripes divergent posteriorly
mirabilis (Signoret) (fig. 32)
Pronotum with a median dark vitta ..... *coalita*, n. sp., page 70

13. Forewing with a number of yellow to orange spots (additional markings may be present) 14
Forewing markings otherwise 18

14. Forewing with spots restricted to corium; crown with a pair of apical spots ..... *chola*, n. sp., page 71
Forewing with spots on both clavus and corium 15

15. With four round orange spots on each forewing, the spots in an omega-shaped pattern with wings in repose ..... *obsoleta* (Signoret) (fig. 35)
Not as above 16

16. Forewings with a number of small elongate-oval markings, in addition to the larger round spots ..... *guttata*, n. sp., page 73
Forewings without such smaller spots 17

17. Scutellum with basal transverse margin black
meridaensis, n. sp., page 74
Scutellum with a black spot in each basal angle, the spots not connected
obsoleta (Signoret) (fig. 35)

18. Forewing with clavus pale, without dark markings 19
Forewing with dark marking on clavus 20

19. Forewing orange with a transverse black marking in anteapical cells; scutellum orange with black basal angles .... *perturbata* (Melichar) (fig. 38)
Forewing gray with a broad longitudinal stripe extending from near base of corium to its apex; scutellum entirely black
obesula (Jacobi) (fig. 39)

20. Face orange with a median black line on clypeus 21
Face orange or otherwise, but without a black line on clypeus 22

21. Crown with a pair of black spots at anterior margin; pronotum with a median vitta and two laterobasal spots black
gaudialis, n. sp., page 74

Crown with a median black spot at apex (the upper extremity of the median clypeal line); pronotum with a broad transverse band bordering posterior margin ..... *torquata*, n. sp., page 76

22. Clypeus and base of clypellus amber, unmarked
gryllula (Breddin) (fig. 42)
Clypeus and clypellus not as above 23

23. Crown with a median basal orange spot; scutellum with a discal orange spot ..... *crassa* (Walker) (fig. 44)
Crown with a median basal black spot; scutellum black, unmarked
halticula (Jacobi) (fig. 45)

Stehlikiana bogotaensis, NEW SPECIES

FIGURE 22

Length of male 7.7 mm, of female 8.0-8.4 mm. Head with median length of crown from six-tenths to slightly more than two-thirds interocular width and from one-third to slightly more than four-tenths transocular width, antennal ledge without a distinct carina, clypeus with muscle impressions not distinct, clypellus with contour of its lower portion slightly concave along apex. Thorax with dorsopleural carinae incomplete; scutellum not transversely rugose behind transverse depression; forewing hyaline; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer convex apically, with a number of macrosetae near posterior margin; aedeagal shaft gradually broadened apically in lateral view, extending posterodorsally; paraphyses with rami slender and acute. Female abdominal sternum VII tapered at midlength, the narrower apical portion more gradually tapering and slightly notched at apex (much as in illustration of *S. novemnotata* (Lethierry) (fig. 26*i*); second valvulae as in *halticula* (Jacobi) (fig. 45, *k*, *m*, *n*); pygofer as in *novemnotata* (fig. 45*j*).

Crown, pronotum, and scutellum pale yellow, a small spot at apex of crown, a median spot on disk of pronotum and a spot contiguous with its posterior margin on each side before basal angle of scutellum, black; forewing hyaline, narrowly black-bordered from near base of costal margin to base of commissural margin, and with a round black spot at base of middle anteapical cell; face, thoracic pleura, and legs, dull yellow.

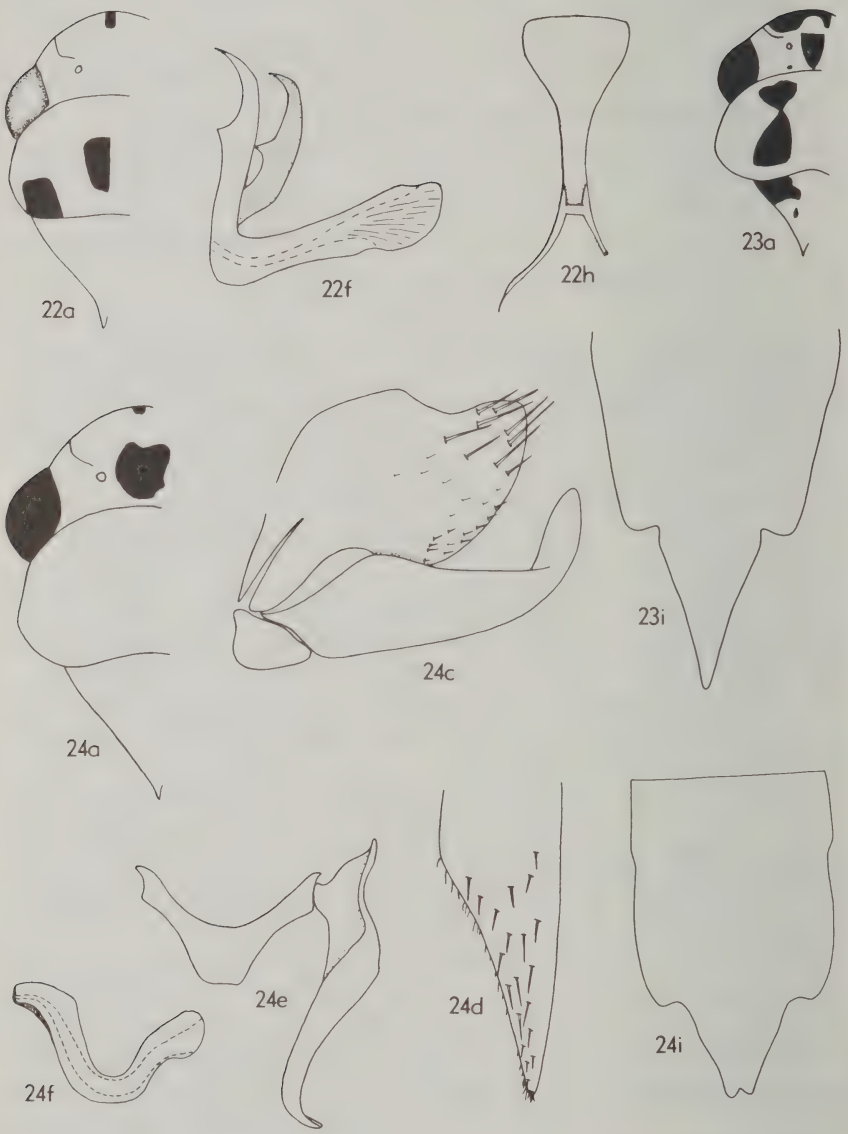
Holotype male, Bogota, [Colombia]; one additional male and seven females, Bogotá (Lindig) (RMS).

Stehlikiana bogotaensis, n. sp., is close to *S. novemnotata* in the genital structures of both males and females, but the forewings of the latter are without the almost complete black border of *bogotaensis*; the crown of *novemnotata* has a pair of black spots not found in *bogotaensis*, and none of the pronotal spots are contiguous with the posterior pronotal margin. Also, the anteapical black spot is not present in the forewing of *novemnotata*.

Stehlikiana denotata, NEW SPECIES

FIGURE 23

Length of female 8.8-9.5 mm, male unknown. Head with median length of crown from slightly less than one-half to six-tenths interocular width and from



FIGURES 22-24.—22, *Stehlikiana bogotaensis,* n. sp. (from specimen from Bogotá, Colombia). 23, *S. denotata,* n. sp. (from specimens from Coroico, Bolivia; *i* from holotype). 24, *S. ramirezi,* n. sp. (*a* and *i,* from specimens from "Sinchono", Peru; others from holotype, apodemes not shown in *f*).

slightly less than three-tenths to more than one-third transocular width, antennal ledge without a distinct carina, clypeus with muscle impressions not distinct, clypellus as in *S. bogotaensis*, n. sp. Thorax with dorsopleural pronotal carinae incomplete; scutellum transversely striate behind transverse depression; forewing translucent; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Female abdominal sternum VII abruptly narrowed slightly beyond midlength, thence narrowed gradually to acute apex; other genital characters as in *S. halticula* (Jacobi) (figs. 45 *j* to *n*).

Crown and pronotum pale yellow with a large median discal black spot on crown and an apical black U-shaped marking at apex of head appearing as a pair of spots in dorsal view; pronotum with a pair of longitudinal black stripes, each constricted before midlength (type) or interrupted; scutellum either yellow with basal angles black or black with a median yellow stripe (type); forewing translucent, grayish, with a narrow black border extending completely around wing except portion next scutellum, with weak dark suffusion in basal half of clavus touching suture and in basal half of corium in the holotype; face yellow with a pair of spots on clypeus, and apex of clypellus, black; thoracic pleura yellow; legs with femora yellow except black spot near knee, tibiae and tarsi mostly black.

Holotype and an additional female, Coroico, Bolivia (RMS). One female, same locality (MMB).

S. denotata is similar to *S. latercula* (Breddin) in the form of the female genitalia, and in size, but the latter has an apical black spot on the head and lacks the black border of the forewings.

Stehlikiana ramirezi, NEW SPECIES

FIGURE 24

Length 9.3 mm. Head with median length of crown slightly more than one-half interocular width and approximately one-third transocular width; antennal ledge usually without a distinct carina, clypeus with muscle impressions not very distinct, clypellus with profile of its lower portion more nearly horizontal than contour of remainder of face. Thorax with dorsopleural carina incomplete, scutellum not or only obscurely transversely striate behind transverse sulcus; forewing with membrane including only inner apical cell; length of first posterior tarsomere greater than combined length of two more distal tarsomeres. Male pygofer convex apically, with a few long macrosetae near posterodorsal angle, numerous small macrosetae parallel to posteroventral margin and a few microsetae on disk; aedeagal shaft slightly broadened apically in lateral view, not expanded anteapically; paraphyses absent. Female abdominal sternum VII abruptly narrowed in apical third to narrow triangular posteriorly produced lobe which is very slightly emarginate at apex.

Crown and anterior portion of pronotum dull yellow, with a large median black spot and a black spot at apex, remainder of pronotum, scutellum, and forewings pale orange; face, pleura, venter, and legs, pale, the tips of the tarsi darkened.

Holotype male, Chanchamayo, Peru, July 22, 1960 (Salazar); one female, same locality, July 25, 1960 (Young and Ramirez) (NCS). Three males and seven females, "Sinchono," Peru (DeLong collection, OSU). Holotype on indefinite loan to USNM.

S. ramirezi, n. sp., may be separated from all other species in the genus by its conspicuously pale color. I take pleasure in naming this species in honor of Carlos Ramirez who was most helpful in collecting specimens during my association with him in Peru.

Stehlikiana erratilis, NEW SPECIES

FIGURE 27

Length of male 9.3-10.1 mm, of female 8.7-9.1 mm. Head with median length of crown varying from slightly more than four-tenths to slightly more than one-half interocular width and from slightly more than one-fourth to one-third transocular width; antennal ledge without a distinct carina, clypeus

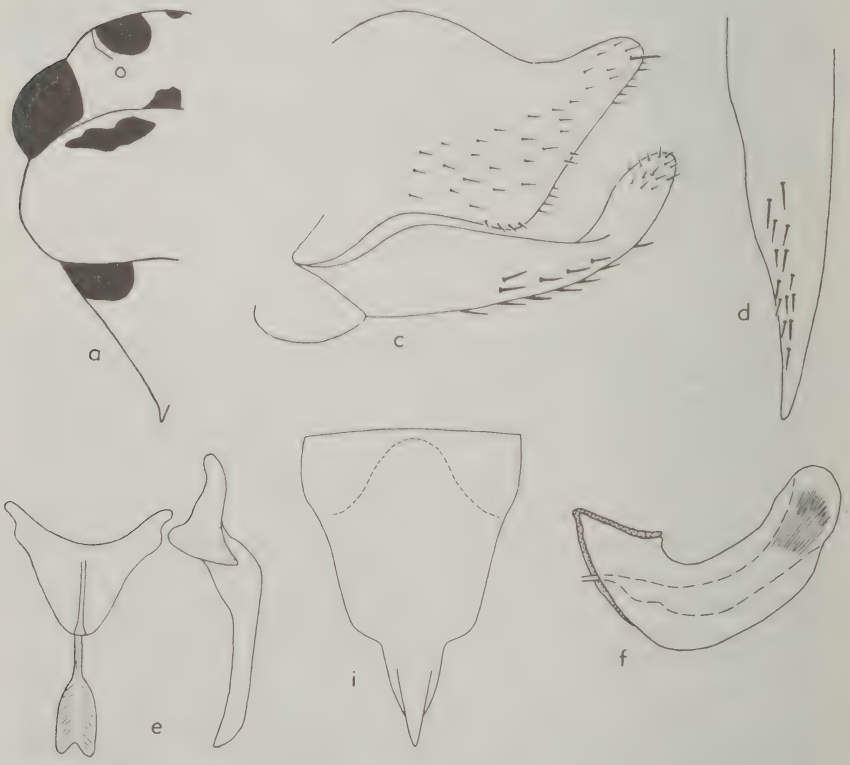
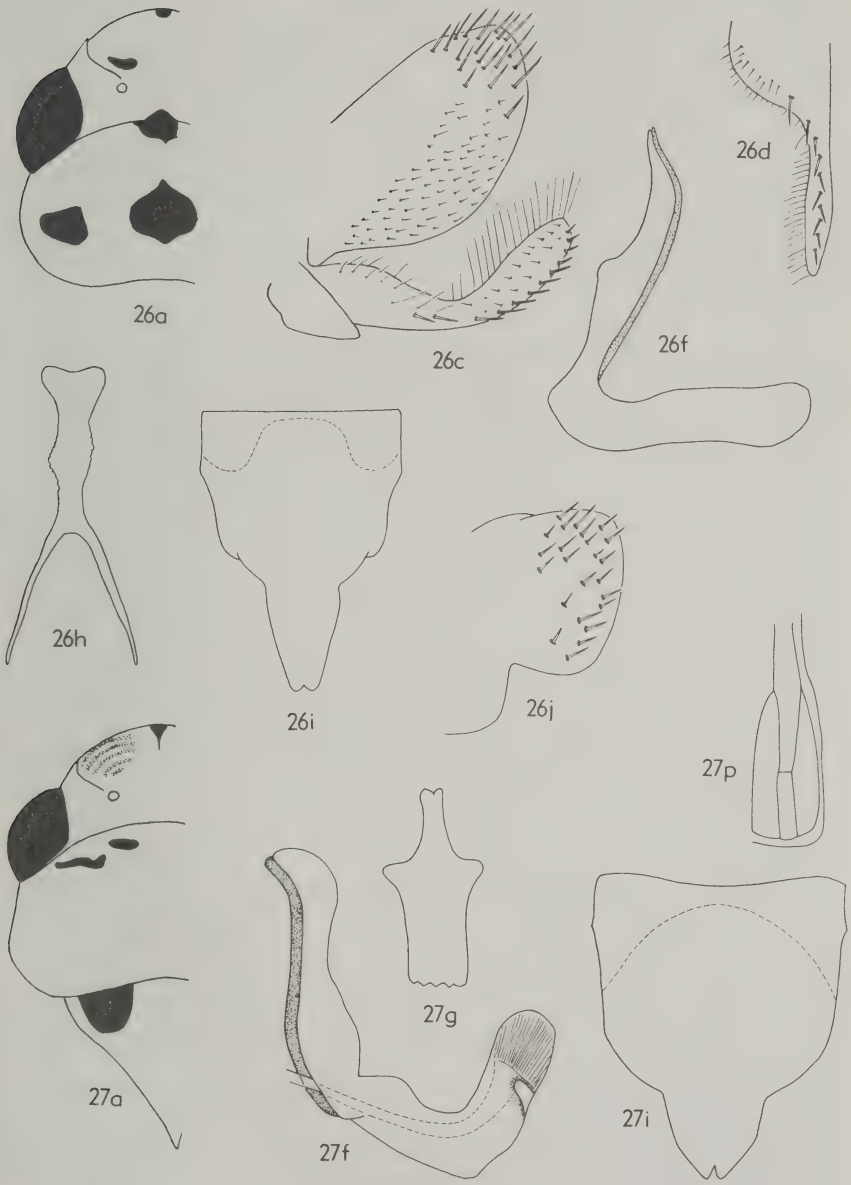


FIGURE 25.—*Stehlikiana latercula* (Breddin) (*a-f*, from specimen from Ecuador, vestigial paraphyses shown in *e*; apodemes not shown in *f*).



FIGURES 26, 27.—26, *Stehlikiana novemnotata* (Lethierry) (from specimens from El Valle, Venezuela). 27, *S. erratilis,* n. sp. (from specimens from Chanchamayo, Peru, only aedeagal apex shown in *g*): *p,* Outer portion of hindwing apex.

with muscle impressions distinct (as a result of dark color), clypellus with profile of its lower portion more nearly horizontal than contour of remainder of face. Thorax with dorsopleural carina incomplete, scutellum obscurely transversely striate behind transverse sulcus; forewing with membrane consisting only of inner apical cell; hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Male pygofer obliquely truncate apically, with a few macrosetae near posterodorsal angle; aedeagal shaft expanded laterally anteapically in caudal view, more distal portion narrowed; paraphyses very lightly sclerotized, broadest before apex, rami very short. Female abdominal sternum VII narrowed in apical third, with a narrow apical emargination; pygofer lobe with few macrosetae near its posterior margin.

Crown and anterior portion of pronotum pale green (dull yellow in older specimens), crown with a median apical spot and muscle impressions black, in some specimens with a pair of small black spots near middle of posterior margin of head; pronotum with a group of variable black markings on green portion near anterior margin, remainder orange to tan, occasionally with a dark line across middle; scutellum orange to tan with a pair of broad black spots on anterior margin; forewing with longitudinal veins and veins forming bases of anteapical cells broadly yellow, intervening areas dark brown to (more rarely) black, with a broad transverse black stripe through anteapical cells, bounded posteriorly by a broad orange transverse stripe, apical wing margin broadly fumose; face green with dark muscle impressions on clypeus and apex of clypellus and a narrow margin along genae, black; thoracic pleura and venter yellow marked with black; abdominal sterna black basally, pale apically, female sternum VII pale with black in laterobasal angles and apical third, remainder pale, legs pale, variably marked with darker.

Holotype male, Chanchamayo, Peru, July 25, 1960 (Salazar and Ramirez); five males, same locality: one July 25 (Young and Ramirez), two July 25 (Young and Salazar), and two July 22, 1960 (C. Ramirez); six males, same locality: four July 25, 1960 (Young and Ramirez), two, same date (Salazar and Ramirez); three females same locality, July 22, 1960 (C. Ramirez) (NCS). Five males, Pozuzo [Peru] (Schaufuss); one male, Callanga, Peru; one male, Coroico, Bolivia (MMB). Two females, Coroico, Bolivia (OSU). Two males, Vilcanota, Peru; one male, Bolivia (HNHM). Three males, Bolivia 1898 (Noualhier) (MHNP). One male, 2 mi. west of San Ramón, Junin, Province, Peru, 900 m., January 5, 1955 (E. I. Schlinger and E. S. Ross). Holotype on indefinite loan to USNM.

Stehlikiana erratilis, n. sp., is very similar to *S. latercula* (Breddin), from which it may be separated by the form of the aedeagal shaft in caudal view. The shaft is not as abruptly broadened anteapically in *latercula* as in *erratilis*. The male genital structures not illustrated for *erratilis* are as in the illustrations of *latercula* (fig. 25 *c-f*).

Stehlikiana burksorum, NEW SPECIES

FIGURE 28

Length of female 8.0 mm, male unknown. Head with median length of crown one-half interocular width and three-tenths transocular width, antennal ledge without a distinct carina, clypeus with muscle impressions not distinct, clypellus with contour of its lower portion more nearly horizontal than remainder of profile of face. Thorax with dorsopleural pronotal carina incomplete; forewing opaque; hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Female abdominal sternum VII narrowed abruptly beyond midlength, then tapered to narrow, notched apex (much as in *S. ramirezi*, n. sp. (fig. 24*i*); other female genital characters as in *S. halticula* (Jacobi) (fig. 45 *j-n*).

Anterior dorsum and forewings orange, an obscure dark spot at apex of head; a median quadrate spot near posterior margin of crown, two large spots on posterior portion of pronotal disk and an angular spot within each basal angle of scutellum, black; clavus except veins, and apical portion of adjacent brachial cell smoky, corium with a broad smoky longitudinal band divided by one orange longitudinal vein through most of its length and with a second vein trisecting it apically, apical cells darker; face and thoracic pleura orange; legs orange, darkened apically.

Holotype female, rain forest, branch of Ichilo River, Bolivia, October 15-16, 1966 (B. and K. Burks) (USNM).

S. burksorum, n. sp., has female genital characters similar to *S. ramirezi*, n. sp., but is distinctively marked, and I haven't been able to find other specimens in the genus that resemble it.

I am happy to name this species in honor of Dr. and Mrs. Burks, old friends, who collected it in a remote region that has produced many unusual leafhoppers.

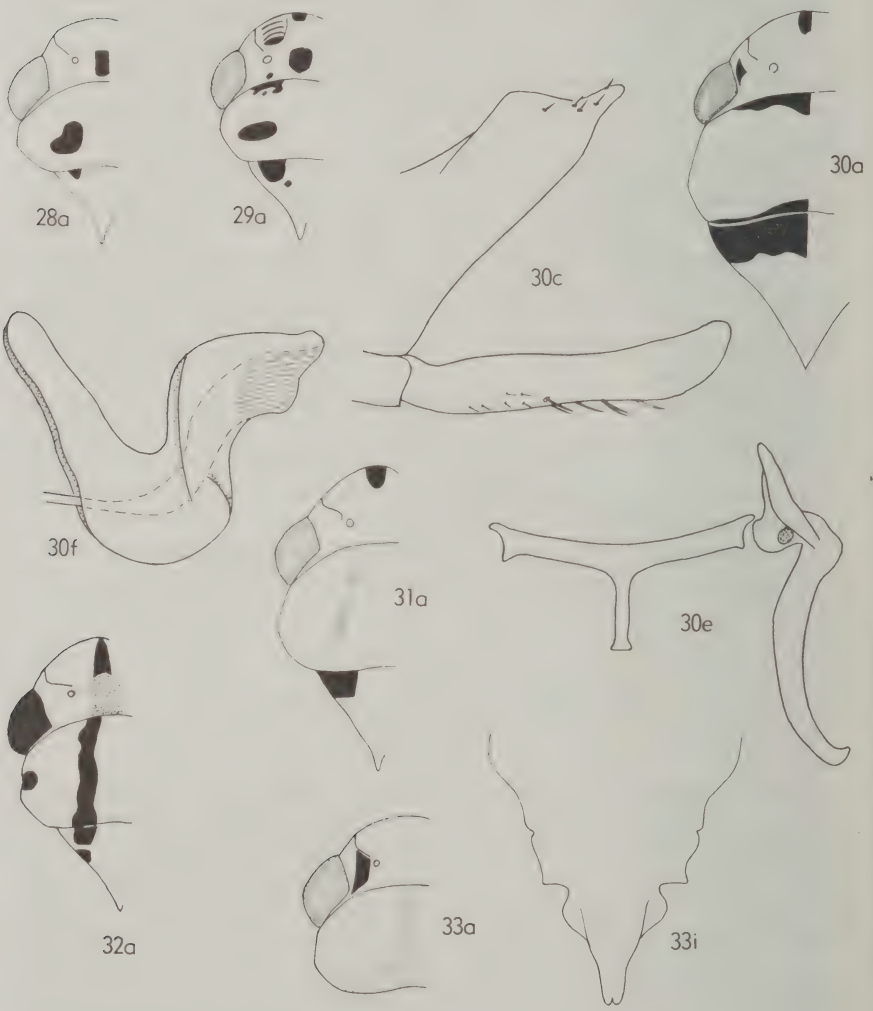
Stehlikiana forsteri, NEW SPECIES

FIGURE 29

Length of female 7.5-8.0 mm, male unknown. Head with median length of crown from slightly less than six-tenths to six-tenths interocular width and one-third or slightly more than one-third transocular width, antennal ledge without a carina, clypeus with muscle impressions distinct, clypellus with contour of its lower portion more nearly horizontal than profile of remainder of face. Thorax with dorsopleural carinae incomplete; scutellum not transversely striate behind transverse depression; forewing mostly opaque, apical cells translucent; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Female abdominal sternum VII abruptly narrowed slightly beyond midlength, thence narrowed gradually to acute apex (as in *S. latercula* (Breddin), fig. 25*i*); other genital characters as in *S. halticula* (Jacobi) (fig. 45 *j-n*).

Crown and anterior portion of pronotum pale green to dull yellow, with a median discal spot, an apical spot on crown and the coronal portion of the clypeal

muscle impressions, black, and a pair of black spots at anterior margin of pronotum (not very distinct in some specimens); remainder of pronotum and scutellum dull orange, with a pair of discal pronotal spots and a spot in each basal scutellar angle, black; forewing rich brown to black, with veins yellow to orange, with a transverse arcuate anteapical pale band, and in one specimen



FIGURES 28-33.—28, *Stehlikiana burksorum*, n. sp. holotype. 29, *S. forsteri*, n. sp., from topotypic female. 30, *S. reclusa*, n. sp., holotype. 31, *S. absona*, n. sp., holotype. 32, *S. mirabilis* (Signoret) (from specimen from Bogotá, Colombia). 33, *S. coalita*, n. sp., holotype.

with an orange area connecting veins in corium near wing base, and another at base of outer anteapical cell; face pale green, with a basal median black spot connecting the black muscle impressions, a longitudinal line on apical portion of clypellus and a small spot on genal margin, black; thoracic pleura yellow with dark spots; legs pale yellow to pale brown, fore- and middle tarsi black, hindleg with apex of femur and two distal tarsomeres, black.

Holotype female, Yungas Forestal, 2500 m., July 6, 1950 (W. Forster); four females, one May 15, one May 16, two May 17, all 1950, Yungas, Coroico, Bolivia, 1900 m., (W. Forster) (SSM). One female and one specimen without abdomen, Chaco, Bolivia; one female S. Antonio, Bolivia (O. Garlepp) (RMS). One specimen without abdomen, Cochabamba, [Bolivia] (Germain, Coll. Noualhier, 1898) (MMB).

The species is named in honor of the collector of several of the type-series, Doctor Walter Forster, curator of Zoologische Sammlung des Bayerischen Staates in Munich, who has been most cooperative and friendly in the course of this work.

Stehlikiana reclusa, NEW SPECIES

FIGURE 30

Length of male 11.7-12.8 mm. Head with median length of crown varying from slightly less than one-half to slightly more than one-half interocular width and one-third or slightly less than one-third transocular width, lateral clypeal sutures extending onto crown and almost attaining ocelli, antennal ledges with anterior margins oblique and convex; clypeus with muscle impressions distinct, clypellus with weak pubescence on its lower portion, transclypeal suture interrupted at middle, clypellus with contour slightly convex above apex but with contour of its lower portion continuing profile of clypeus. Thorax with pronotal width greater than transocular width of head, lateral pronotal margins convergent anteriorly, dorsopleural carinae incomplete, disk without sculpturing; scutellum not transversely rugose behind transverse sulcus; forewing with membrane including apical portions of apical cells; hindleg with length of first tarsomere equal to or greater than combined length of two more distal tarsomeres. Male pygofer narrow, abruptly narrowed anteapically to a narrow digitiform apex, macrosetae few, anteapical; plates extending posteriorly as far as pygofer apex, each with very small black setae that are not uniseriate; connective with arms widely divergent, stem short and narrow; aedeagus with shaft short and arcuate; paraphyses absent. Female unknown.

Anterior dorsum and forewings dull orange, a variable spot at apex of crown, a transverse line bordering anterior pronotal margin, a variable band bordering posterior pronotal margin and extending onto base of scutellum, a narrow transverse band on corium extending from middle of claval suture laterad almost to costal margin, a narrow transverse band across bases of anteapical cells, and membrane, black. Face and propleura orange, a median clypeal stripe, apex of clypellus and lateral margins of genae black; remainder of thoracic pleura yellow with black markings. Legs with femora greenish, apical portions of posterior tibiae and basal posterior tarsomeres orange, knees of posterior legs and their femoral apices and remaining tarsomeres, black.

Holotype male, Sta. Helena, Bolivia, 1922 (W. M. Mann), Mulford Biological Exploration; one male, La Paz, Bolivia, 24 km. w. of Coripata, May 2-6, 1969 (P. and P. Spangler) (USNM). Four males Callanga, Peru, Paucartambo Prov., Dept. Cuzco, Feb. 23, 1952 (F. Woytkowski) (NCS). One male, Callanga, Peru; and one male, Coroico, Bolivia (RMS). One male Vilcanota, Peru (MMB). One male, Callanga, Peru (HNHM).

S. reclusa, n. sp. is longer and more slender than most other species of *Stehlikiana*. The markings and the form of the male pygofer are distinctive.

Stehlikiana absona, NEW SPECIES

FIGURE 31

Length of female 11.1 mm, male unknown. Head with median length of crown slightly less than six-tenths interocular width and slightly less than four-tenths transocular width, antennal ledge without a carina, clypeus with muscle impressions distinct, clypellus with contour continuing profile of clypeus. Thorax with dorsopleural carinae almost complete; scutellum not transversely striate behind transverse depression; forewing coriaceous (damaged apically, but with base of inner apical cell membranous); hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Female abdominal sternum VII tapered gradually for the genus (much as in *S. gaudialis*, n. sp., fig. 40*i*); second valvulae and pygofer much as in *S. halticula* (Jacobi) (fig. 45 *j-n*).

Ground color of dorsum, including forewings, orange, with a median black spot at apex of crown, a pair of posteriorly diverging dark longitudinal lines near middle of pronotum, a black spot in each basal angle of scutellum; on forewings, basal portion of costal margin narrowly, a small diagonal mark near midclavus touching commissural margin, three claval spots touching claval suture at base, at midlength, and at apex, a discal transverse spot on basal half of corium and two transcorial bands in apical half of corium, black; face and legs concolorous with dorsum except darkened tarsi.

Holotype female, Colombia, 1941 (L. Richter) (USNM).

S. absona, n. sp., is the largest species I have seen in the genus. It is also distinctively colored. In form, it is closer to *S. obsoleta* (Signoret) than to other species of *Stehlikiana*.

Stehlikiana coalita, NEW SPECIES

FIGURE 33

Length 9.3 mm. Head with median length of crown more than one-half interocular width and one-third transocular width or slightly less, antennal ledge without a distinct carina, clypeus with muscle impressions distinct, clypellus with contour continuing profile of clypeus. Thorax with dorsopleural carinae incomplete (sculpturing of scutellum concealed); forewing with only inner apical cell membranous; hindleg with length of first tarsomere approximately equal to

combined length of two more distal tarsomeres. Male pygofer narrowed posterodorsally as in *S. latercula* (Breddin) (fig. 25*c*) and with similar chaetotaxy; plates as in *latercula* but more nearly truncate apically; aedeagus much as in *S. chola*, n. sp. (fig. 34*f*), but with ventral margin of apex of shaft slightly convex; paraphyses absent. Female abdominal sternum VII gradually tapered from base to apex but with lateral margins very irregular (fig. 33*i*); other genital characters as in *S. halticula* (Jacobi).

Crown brown with a black spot laterad of each ocellus in male; pronotum sordid yellow with median longitudinal stripe brownish-black, connected anteriorly with a narrow transverse concolorous marginal marking and a broader transverse concolorous marginal band extending between humeral margins in male, the anterior transverse marking absent in female and the posterior band interrupted on each side of median stripe; forewing brown with two coalesced diagonal lobate dull yellow spots on clavus and corium of each wing, the claval portions located opposite scutellar apex (wings at rest) and behind claval midlength, and a transverse similarly colored spot in corium across anteapical cells, female with smaller pale spots in intervening areas; male with clypeus and median portion of clypellus dull yellow, the clypeus with a median longitudinal black spot, remainder of face black; female with face sordid yellow except a black area on each side of clypellus and a narrow black portion of genal margin; propleura of both sexes yellow; legs sordid tan with dark spots at midfemora, apices of tibiae and apices of tarsomeres.

Holotype female and one male, Ecuador (MMB).

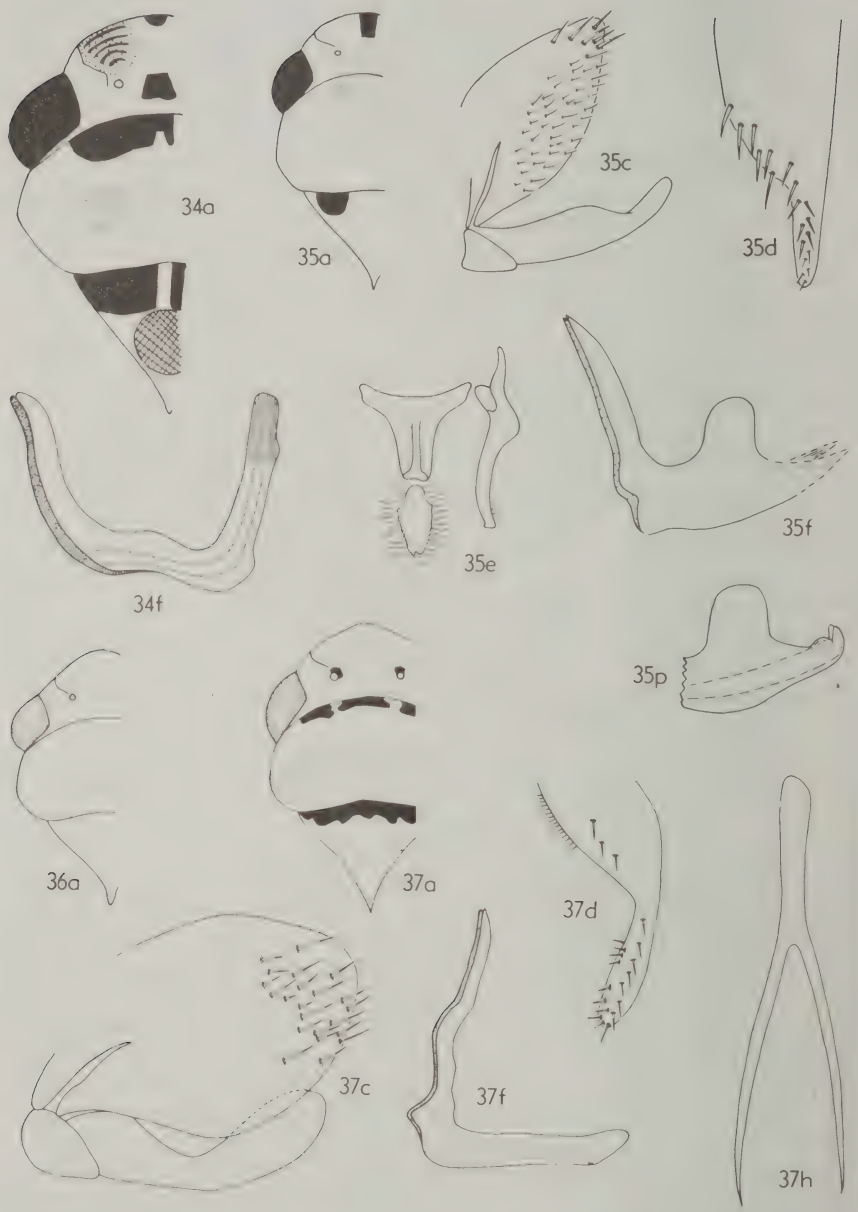
S. coalita, n. sp., is readily separable from all other species in the genus by the distinctive abdominal sternum VII of the female and the distinctive coloration.

Stehlikiana chola, NEW SPECIES

FIGURE 34

Length of male 8.3-8.8. Head with median length of crown varying from four-tenths to one-half transocular and from one-fourth to three-tenths transocular width, antennal ledges with or without a distinct carina, clypeus with muscle impressions distinct (as result of dark color), clypellus with profile of its lower portion more nearly horizontal than contour of remainder of face. Thorax with dorsopleural carinae incomplete; scutellum obscurely transversely striate behind transverse sulcus; forewing with membrane not clearly delimited, consisting at least of inner apical cell; length of first posterior tarsomere approximately equal to combined length of two more distal tarsomeres. Male pygofer with apical margin oblique and slightly convex, chaetotaxy as in *S. ramirezi*, n. sp., (above); plates with multiseriate setae; aedeagal shaft more slender (fig. 34*f*) than in other species in the genus; paraphyses reduced, much as in *S. latercula* (Breddin) (fig. 25*e*). Female unknown.

Crown pale brown with median spots at base and at apex and a spot on each side of apex covering muscle impressions, black; pronotum concolorous with crown, with a narrow transverse black band along anterior margin and occasionally interrupted medially, with a pair of faint discal brown spots;



FIGURES 34-37.—34, *Stehlikiana chola*, n. sp., holotype. 35, *S. obsoleta* (Signoret) (*a* and *p*, from specimen from Villavicencio, Colombia; *c-f*, from lectotype; vestigal paraphysis shown in *e*): *p*, Aedeagus from lateral view. 36, *S. guttata*, n. sp., holotype. 37, *S. meridaensis*, n. sp., holotype.

scutellum tan with a broad transverse black band which is interrupted medially; forewing brown, corium with a round spot opposite claval apex, a transverse band opposite apical half of clavus, not reaching costal margin, and a transverse band through anteapical cells and attaining costal margin, yellow, with a translucent spot next to costa between the transverse bands; face tan with muscle impressions, a spot on each side below muscle impressions, a median sagittate mark at clypellar apex, and two narrow spots on each genal margin, black; thoracic sterna and pleura tan marked with black; male abdominal sterna black basally, yellow apically, male plates dark basally with narrow pale lateral margins, pale apically.

Holotype and three additional males, "Pozuzu" [Pozuzo] Peru (Schaufuss) (MMB).

S. chola, n. sp., is close to *S. latercula* (Breddin), but may be distinguished by the narrower aedeagal shaft than in *latercula*, and by the characters used in the key.

Stehlikiana guttata, NEW SPECIES

FIGURE 36

Length of female 8.7 mm, male unknown. Head with median length of crown approximately six-tenths interocular width, and four-tenths transocular width, antennal ledge with a weak carina, clypeus with muscle impressions obscure, clypellus with contour of its lower portion continuing profile of clypeus. Thorax with dorsopleural carinae complete; scutellum transversely striate behind transverse depression; forewing with only inner apical cell and apical portion of second apical cell membranous, remainder coriaceous; hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Female abdominal sternum VII as in *S. coalita*, n. sp., (fig. 33*i*); other female genital characters as in *S. halticula* (Jacobi) (fig. 45 *j-n*).

Crown, pronotum, and scutellum yellow, crown tinged with orange, pronotum with a narrow median and a broader spot on each side all touching posterior margin, castaneous; forewing castaneous with costal area, a large round spot in base of clavus and two or three smaller oval claval spots, a large spot on corium opposite basal half of clavus, a larger one opposite apical half of clavus, and a transverse band across bases of apical cells, yellow, and with a few smaller spots on corium between the larger ones; face yellow, clypeus tinged with orange above, a narrow black spot on posterior margin of genae; thoracic pleura yellow; legs yellow, a spot before apex of middle and posterior femur, tibial apex, and apices of some of tarsomeres, black.

Holotype female, Colombia, March 11, 1912 (Cornell University).

The markings of the forewings are not symmetrical. *S. guttata*, n. sp., is close to *coalita* in the structure of the female genitalia, but *guttata* is smaller and distinctively marked.

Stehlikiana meridaensis, NEW SPECIES

FIGURE 37

Length of male 8.0 mm, of female 8.0-8.4 mm. Head with median length of crown from slightly more than one-half to almost six-tenths interocular width and from one-third to almost four-tenths transocular width, antennal ledges not carinate, clypeus with muscle impressions not distinct, clypellus with contour continuing profile of clypeus. Thorax with dorsopleural carinae incomplete; scutellum transversely rugose behind transverse depression; forewing with inner two apical cells membranous; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer convex apically, with macrosetae near posterior margin and with numerous minute microsetae on posterior half of disk; plates not extending posteriorly as far as pygofer apex, setae not uniseriate; aedeagal shaft not much narrower near apex than at base; paraphyses with rami longer than stalk, slender, tapering, and acute at their apices. Female abdominal sternum VII tapered at midlength, the narrower apical portion more gradually tapered to slightly notched apex (much as *S. gaudialis*, n. sp. (fig. 40*i*)); second valvulae much as in *S. halticula* (Jacobi) (fig. 45 *k-n*); pygofer as in *S. novemnotata* (Lethierry) (fig. 26*j*).

Crown, anterior portion of pronotum, and scutellum, orange, a narrow pale brown transverse band behind middle of pronotum, occasionally interrupted, ground color of pronotum green-tinged behind the band, anterior margin of pronotum and of scutellum narrowly black; forewings dull brown, each with two oval spots in clavus, an oval spot in basal half of corium, a diagonal spot opposite claval apex, and a transverse spot through anteapical cells, orange; face amber with a small black spot near base of clypeus; propleura and femora pale yellow, tibiae and tarsi tinged with brown.

Holotype and two additional males, Mérida, Venezuela, Río Albaregas, 8000 ft., November 11, 1939 (J. Hambury-Tracy); three females, E. of Mérida, Venezuela, Acequias, 8000 ft., October 16, 1939 (same collector) (BM). One female, Mérida, Venezuela (Briceno) (HNHM).

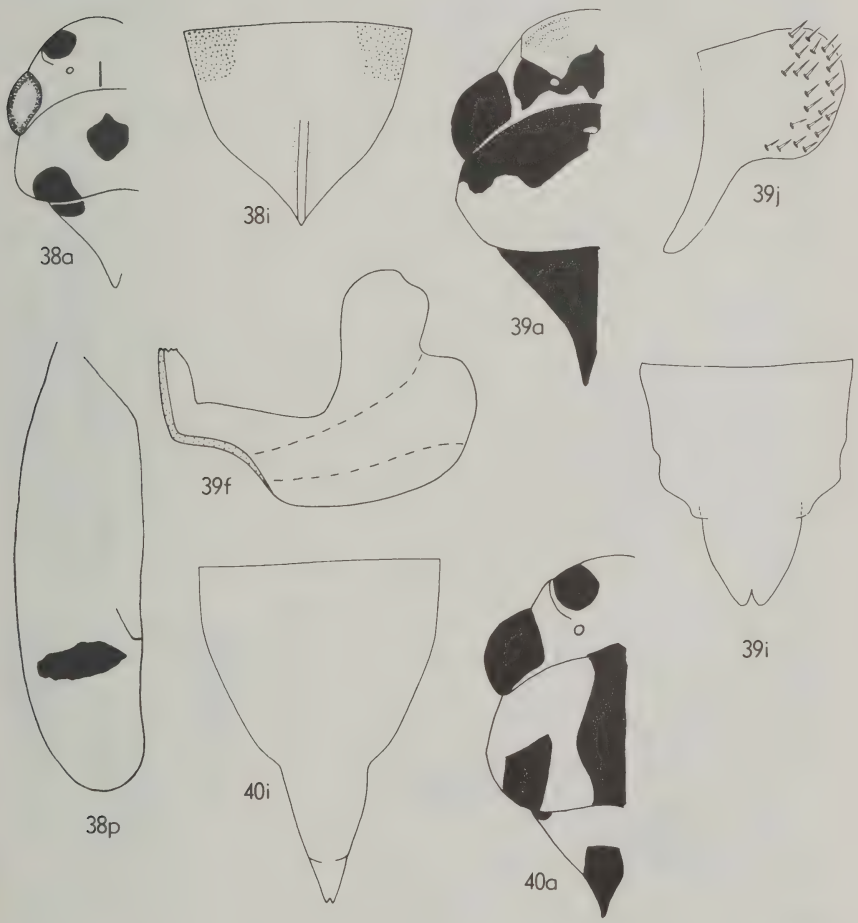
Externally, *S. meridaensis*, n. sp., is similar to *S. obsoleta* (Signoret), but the latter lacks the transverse pronotal dark band, has an apical black spot on the crown, and black spots in the basal angles of the scutellum, all differing from *meridaensis*. The structure of the aedeagus of *obsoleta* and the form of the paraphyses are also different from *meridaensis*.

Stehlikiana gaudialis, NEW SPECIES

FIGURE 40

Length of male 8.3 mm, of female 8.5 mm. Head with median length of crown from slightly more than one-half to slightly more than six-tenths interocular width, and from one-third to approximately four-tenths transocular width, antennal ledge carinate, clypeus with muscle impressions indistinct, clypellus with profile of its lower portion more nearly horizontal than contour of remainder of face. Thorax with dorsopleural carinae incomplete; scutellum with or without

transverse rugae behind transverse sulcus; forewing without a membrane; hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male genitalia as in *Stehlikiana novemnotata* (Lethierry) (fig. 26), except that macrosetae of male plates are multiordinal. Female abdominal sternum VII gradually tapered in apical half to subacute apex (weakly emarginate at apex in macerated specimens).



FIGURES 38-40—38, *Stehlikiana perturbata* (Melichar), lectotype: *p*, Forewing. 39, *S. obesula* (Jacobi) (*a, i, j*, from specimen from Marcapata, Peru; *f* from Rioja, Peru). 40, *S. gaudialis*, n. sp. (specimens from Colombia, *a* from holotype).

Ground color of entire dorsum orange, crown with a large marginal black spot on each side of apex, a basal spot continuous with a full length median longitudinal pronotal stripe and an angular marginal pronotal marking on each side near basal angles of scutellum, black; scutellum with a small spot in each basal angle and an apical black mark; forewing with a narrow marginal stripe on claval commissure, a large H-shaped black mark in corium opposite clavus, but also involving outer basal portion of clavus, and a large black spot in corium opposite claval apex; face orange with a median black stripe on clypeus, a marginal black spot on each genal margin opposite base of lorum, and a pair of black spots at clypellar apex; pleura, thoracic sterna and legs dull orange except for black spots on mesepisternum; abdomen with black markings more extensive.

Holotype male and two females, Colombia, 1941 (L. Richter) (NCS). Holotype on indefinite loan to USNM.

Stehlikiana gaudialis, n. sp., is similar to *S. novemnotata* (Lethierry) (fig. 26) in the structure of the male genitalia, but is easily separated from *novemnotata* by its markings.

Stehlikiana torquata, NEW SPECIES

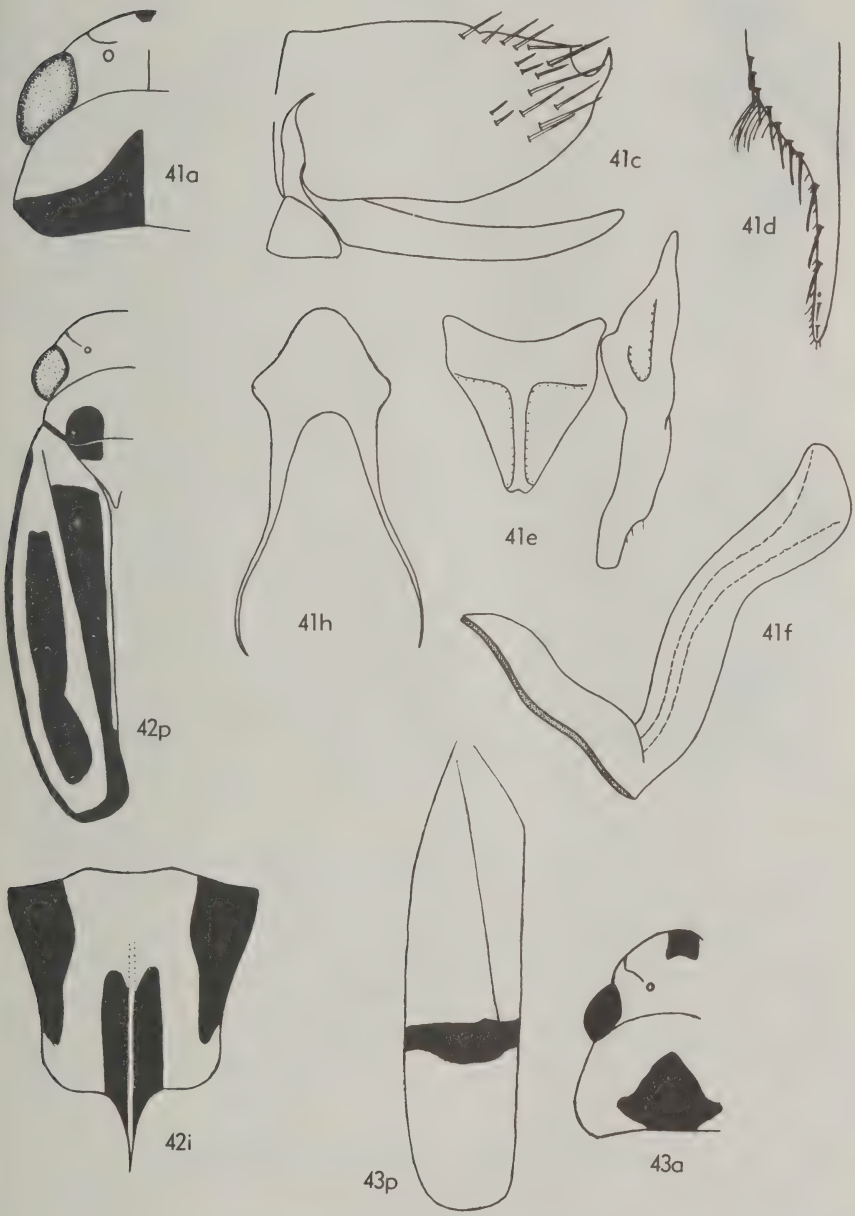
FIGURE 41

Length of male 7.3 mm, of female 7.3-7.6 mm. Head with median length of crown varying from one-half to almost six-tenths interocular width and from one-fourth to three-tenths transocular width, antennal ledges without a carina, clypeus with muscle impressions not distinct, clypellus with contour of its apical portion abruptly concave. Thorax with dorsopleural carinae complete; scutellum not rugose behind transverse depression; forewing with membrane not distinctly delimited; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male genitalia much as *S. meridaensis*, n. sp. (above), but with rami of paraphyses longer in relation to stalk and with aedeagus slightly broadened at apex.

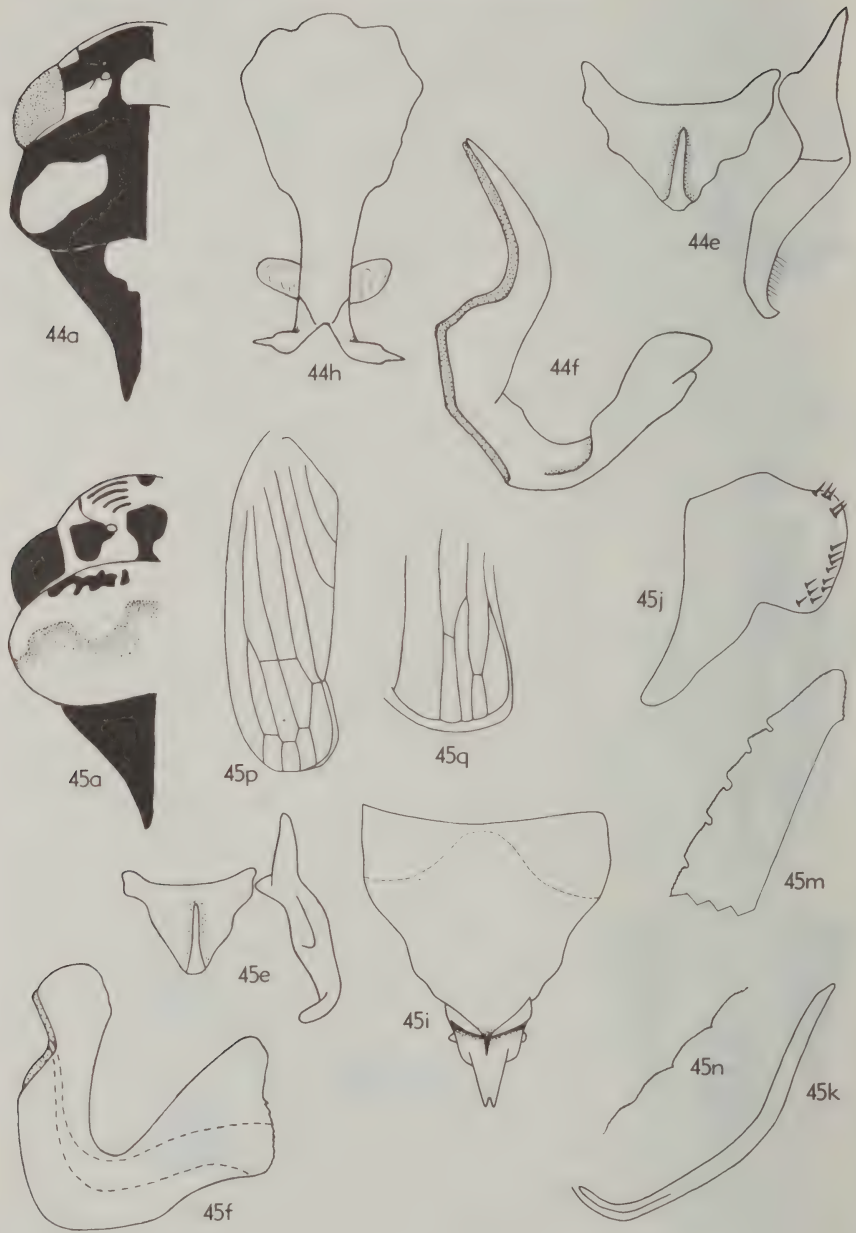
Crown, anterior portion of pronotum, and scutellum sordid yellow, a small spot at apex of crown and a broad basal band on pronotum, extending more anteriorly at middle, black; forewing brown to black with a longitudinal band at claval commissure that is broadened in its apical half, an oval spot astride claval suture in basal half and a more elongate oval spot bordering costal margin in its apical half, yellow; face sordid yellow with a black median stripe over clypeus and basal portion of clypellus; thoracic pleura yellow; legs dull yellow.

Holotype male and two females, Baños, Ecuador 2500 m., May 6, 1939 (W. Clark-Macintyre) (NCS). Holotype on indefinite loan to USNM.

S. torquata, n. sp., is similar to *meridaensis* in the structure of the male genitalia, differing as in the description above. The dark wings with the elongate oval spots are distinctive in *torquata*.



FIGURES 41-43.—41, *Stehlikiana torquata,* n. sp., holotype. 42, *S. gryllula* (Breddin), lectotype: ♂, Anterior dorsum and forewing. 43, *S. perspicua* (Melichar), lectotype: ♀, Forewing.



FIGURES 44, 45.—44, *Stehlikiana crassa* (Walker) (*a* from specimen from Baños, Ecuador, remainder from El Valle, Venezuela). 45, *S. halticula* (Jacobi) (*e* and *f*, from lectotype; remainder from Marcapata, Peru): *p*, Forewing; *q*, apex of hindwing.

10. Genus PARINAEOTA Melichar

Figure 46

Parinaeota Melichar, 1926a:341. Type-species: *Parinaeota bakeri, nomen nudum,* by subsequent designation of Evans, 1947a:163 (species described hereinafter).

Length of female 10.4 mm.

Head well produced with anterior margin broadly rounded in dorsal view, median length of crown almost two-thirds interocular width and approximately four-tenths transocular width, with a carina at median portion of transition from crown to face, ocelli located before a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, crown strongly convex between ocelli, lateral clypeal sutures extending onto crown but not attaining ocelli; antennal ledges protuberant, in lateral view with anterior margins vertical and almost rectilinear; clypeus convex, muscle impressions not very distinct, face with weak pubescence on its lower portion, transclypeal suture interrupted medially, clypellus not strongly produced, its profile continuing contour of clypeus.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin obtusangularly concave, surface pubescent with strong depressions behind anterior margin and coarsely transversely rugose on remainder; scutellum transversely striate behind transverse sulcus. Forewing with only inner apical cell membranous; veins elevated and distinct, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, bases of anteapical cells proximal to claval apex; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:0:0, length of first tarsomere approximately equal to combined length of two more distal tarsomeres, with two parallel rows of small setae on plantar surface.

Male unknown.

Female genital structures as in *Stehlikiana,* new genus.

Parinaeota Melichar is closer to *Stehlikiana* than to other genera treated here, but *Stehlikiana* differs in lacking a carina at the transition from crown to face, in that the ocelli are behind a line between the anterior eye angles, in that the crown is concave, in that the clypeus is flattened, in the usually narrower thorax in relation to the transocular width of the head, and in the 2:1:1 hind femoral setal formula. *Parinaeota* is known only from the type-species, from Peru, described below.

Parinaeota bakeri, new species

Figure 46

Structural characters as in generic description. Ground color of anterior dorsum and forewings tan with following markings black: a pair of round spots near apex at transition to face, a quadrate spot above antennal ledge on each side bordering inner eye margin and an angular spot at base behind

each ocellus, on crown; a pair of longitudinal stripes on each side and indistinct median line on pronotum; a spot in each basal angle of scutellum; angulate vittae along humeral margin and commissural margin of clavus, and a number of spots occurring sparsely in corium of each forewing, none of the spots traversing wing veins. Face tan with a transverse black stripe at its dorsal extremity; legs tan with anterior tibiae and tarsi, middle femoral apices and tibiae and tarsi, spots on hind femora, and the femora near their bases, black.

Holotype female, Marcapata, Peru (HNHM). This specimen bears Melichar's handwritten determination label and a "Typus" label.

11. Genus CEPHALOGONALIA Evans

Figure 47

Cephalogonia Melichar, 1926a:342. Type-species: *Tettigoniella flabellula* Jacobi (1905c:175), by subsequent designation of China, 1938d:184 (preoccupied).
Cephalogonalia Evans, 1947a:160 (new name).

Length of male 11.8-12.6 mm.

Head only slightly produced, median length of crown varying from slightly less than one-half to less than six-tenths interocular width and from slightly less than three-tenths to one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, crown transversely concave, surface without sculpturing or setae; lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex, ledges not carinate dorsally;

46a

47a

FIGURES 46, 47.—46, *Parinaeota bakeri*, n. sp., holotype. 47, *Cephalagonalia flabellula* (Jacobi) (from specimen from Callanga, Peru).

clypeus flattened, muscle impressions obscure; face pubescent below, transclypeal suture obsolete medially, clypellus not produced, its lower portion almost continuing profile of clypeus.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae incomplete, posterior margin concave, with a transverse concavity near anterior margin delimiting an anterior collarlike portion of pronotum, disk with punctures weak and sparse, without pubescence; scutellum not distinctly striate behind transverse sulcus. Forewing without a membrane, veins not distinct, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins, texture translucent. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia as in *Trichogonia* Breddin, except that aedeagal orifice is apical and ventral instead of anteapical and ventral, and with basal portion of paraphyses distinct.

Female unknown.

Cephalogonalia Evans is known only from the type-species, of which I have seen specimens from Peru and Bolivia. It is closely similar to *Stehlikiana,* new genus, but is larger, and the male plates lack macrosetae. It is also near *Trichogonia,* but specimens lack a keel at the transition from crown to face, and have vein R_{2+3} of the hindwing entire, both of which differ from *Trichogonia.* Generic relationships are discussed further in the treatment of *Trichogonia.*

My interpretation of *Tettigoniella flabellula* Jacobi is based on a study of the male lectotype.

12. Genus APULIA Distant

Figures 48-58

Apulia Distant, 1908a:525. Type-species. *Tettigonia quadrimacula* Walker, by original designation.

Apulina Melichar, 1926a:345. Type-species: *Tettigonia elongata* Signoret, by present designation.

Length 13.3-18.0 mm.

Head strongly produced, median length from six-tenths to more than eight-tenths interocular width and from slightly less than one-half to slightly more than one-half transocular width, anterior margin sharply rounded to angulate in dorsal view, with or without a carina at transition from crown to face, surface of crown usually convex except for transverse concavity before ocelli, rarely (*A. resupinata,* n. sp.; *A. elongata* (Signoret)) with a broad shallow median fovea, with or without a concavity laterad of each ocellus, lateral clypeal sutures extending onto crown but usually not attaining ocelli; antennal ledges with anterior margins oblique and rectilinear or slightly convex in lateral view, usually with a very narrow fovea dorsally; face convex (rarely slightly

DILOBOPTERUS GENERIC GROUP

12. Apulia

13. Zaruma

14. Tettiselva

15. Dilobopterus

16. Lissoscarta
17. Mucrometopia
18. Teleogonia
19. Willeiana
20. Begonalia
21. Gorgonalia
22. Amblyscarta
23. Poeciloscarta
24. Cardioscarta
25. Kogigonalia
26. Janastana
27. Xenogonalia
28. Oeogonalia
29. Exogonia
30. Amblyscartidia
31. Paratubana
32. Caragonalia
33. Chichahua
34. Orechona
35. Rhopalogonia
36. Sphaeropogonia
37. Hanshumba
38. Eldarbala

flattened medially) in profile with a slight median protuberance on lower half of clypeus, muscle impressions distinct, without pubescence or with pubescence indistinct.

Pronotum with hind margin often very steeply declivous, usually concave medially, rarely convex, disk usually punctate, occasionally rugose or rugose and punctate, scutellum with posterior half elevated in profile. Forewing with or without a membrane, usually not well-delimited and variable intraspecifically when present, veins usually not elevated, indistinct, apical cells usually indistinct, often with supernumerary anteapical crossveins which form an anteapical plexus of veins, texture coriaceous. Hindleg with femoral setal formula 2:1:1; length of first tarsomere equal to or greater than combined length of second and third tarsomeres, with two parallel rows of short setae on plantar surface.

Male genitalia: Pygofer strongly produced, macrosetae varying in size from very large to quite small, usually distributed on posterior half of disk, occasionally on posteroventral and ventral margin also, with processes present or absent, arising on dorsal or apical margin when present. Plates triangular, separate throughout their length, usually not extending nearly as far posteriorly as pygofer apex, usually with uniseriate macrosetae, often with numerous microsetae also. Style with length variable interspecifically with relation to connective, with or without preapical lobe, truncate or not apically. Connective Y- or broadly V-shaped, often with median carina. Aedeagus with at least an apical dependent process. Paraphyses present or absent.

Female with abdominal sternum VII very strongly produced posteriorly, with a complex large sclerite or sclerites in genital chamber varying interspecifically. Second valvulae each bearing quadrate teeth with secondaries on apical one-half to two-thirds of dorsal margin beyond basal curvature, apex narrowly rounded, apicoventral margin rectilinear, dorsal margin convex anteapically and slightly concave more proximally. Pygofer either with long macrosetae on disk and near apex or with shorter macrosetae distributed submarginally along posteroventral margin and near apex.

Species of *Apulia* are pale yellow, pink, yellow marked with purple or purple marked with yellow.

The range of *Apulia* Distant is from Colombia to Bolivia. Externally the species resemble species of *Zaruma* Melichar, and the two genera are similar in a number of other respects, also. The form of the aedeagus in *Apulia* is distinctive, and in the females, the abdominal sternum VII is less tapered than in *Zaruma,* and is often truncate or emarginate.

Apulia is the first genus included in the *Dilobopterus* generic group. This is a larger group of genera than those of the *Neiva* and *Trichogonia* generic groups, and much less homogeneous than the last two. The grouping is tentative, and includes several complexes of genera, briefly discussed in the generic treatments below. Additional studies, especially of finer details of the comparative morphology of the female genitalia than have been observed, and of the biology of the included genera will certainly result in refinements and changes in concepts of the relationships of the genera included in this generic group.

The species which Melichar intended to be the type of his genus *Apulina* and which Evans (1947a:159) cited as type is actually a specimen of *Apulia elongata* (Signoret).

In spite of the rather large size of the species of *Apulia*, specimens are rare in collections. The above description of the ovipositor is based on dissections of only four species.

The male genitalia of the lectotype of *Tettigonia elongata* Signoret have been compared with the illustration published here. The present interpretation of *A. excelsa* Distant rests on a male not directly compared with the female lectotype, but believed to be correctly associated. The identity of *T. quadrimacula* Walker is based on the female holotype and specimens of both sexes subsequently associated with the illustration of the holotype. *A. amalda* Distant is placed in synonymy below on the basis of a comparison of its female lectotype with the holotype of *quadrimacula*.

The male genitalia of the holotype of *Tettigonia pruinosa* Walker are like those of *quadrimacula* Walker except for the parts illustrated. *A. hyala* Distant is

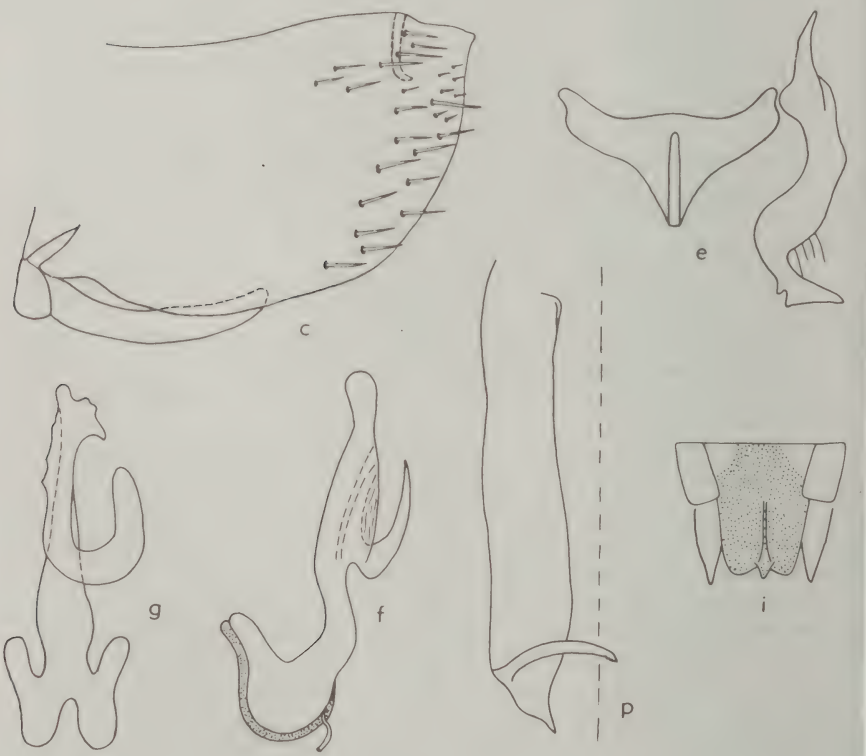


FIGURE 48.—*Apulia hyacinthinula* (Jacobi) (*i* from lectotype; others from specimen from Tingo María, Peru,): *p*, Male pygofer, dorsal view.

known only from females. The female lectotypes of *Tettigoniella hyacinthinula* Jacobi and *T. marquardti* Jacobi have been compared. The male genitalia of *hyacinthinula* were illustrated from a specimen subsequently identified by means of sketches of the lectotype. *A. hyacinthinula* (Jacobi) is greatly variable in color.

SPECIES OF *APULIA*

elongata (Signoret), 1854c:495 (*Tettigonia*). Colombia, Ecuador.
excelsa Distant, 1908a:525. Bolivia.
flora Distant, 1908a:526. Ecuador.
grisea, n. sp. Colombia.
hyacinthinula (Jacobi), 1905c:170 (*Tettigoniella*). Peru.
marquardti (Jacobi), 1905c:171 (*Tettigoniella*). New synonymy.
hyala Distant, 1908a:526. Bolivia.
pruinosa (Walker), 1851b:743 (*Tettigonia*). Colombia. New combination.
punicea, n. sp. Ecuador.
quadrimacula (Walker), 1851b:741 (*Tettigonia*). Colombia.
amalda Distant, 1908a:527. New synonymy.
resupinata, n. sp. Peru
revoluta, n. sp. Bolivia.

KEY TO MALES OF *APULIA*

(*A. hyala* Distant not included)

1. Pygofer with a dorsal anteapical process which is sclerotized or not 2
   Pygofer without a process so located 4

2. Pygofer process not differentially sclerotized, extending posterodorsally 3
   Pygofer process more heavily sclerotized than pygofer, extending mesally *hyacinthinula* (Jacobi) (fig. 48)

3. Pygofer more elongate (fig. 49*c*), decurved aedeagal process broader, not extending as far towards base of shaft and spinulose *excelsa* Distant (fig. 49)
   Pygofer shorter (fig. 50*c*), decurved aedeagal process narrower and longer, not spinulose ..... *punicea,* n. sp., page 86

4. Aedeagus without a process or processes in addition to the apical dependent process 5
   Aedeagus with one or more processes in addition to the dependent process 6

5. Aedeagus in lateral view with process decurved from shaft apex (fig. 53*f*) *grisea,* n. sp., page 89
   Aedeagus in lateral view with process recurved, parallel to shaft (fig. 52*f*) *revoluta,* n. sp., page 88

6. Pygofer with apex strongly produced posterodorsally, style apex with a mesal angle in dorsal view ..... *flora* Distant (fig. 54)
   Pygofer with apex much more rounded, style with apical portion curved posterolaterally 7

7. Aedeagus with dependent process extending ventrally beyond base of shaft (fig. 55*f*) ..... *resupinata*, n. sp., page 92
   Aedeagus with dependent process not extending ventrally as far as base of shaft 8

8. Aedeagus with a pair of additional processes at base of dependent process ..... *elongata* (Signoret) (fig. 56)
   Aedeagus with a single additional process at base of dependent process 9

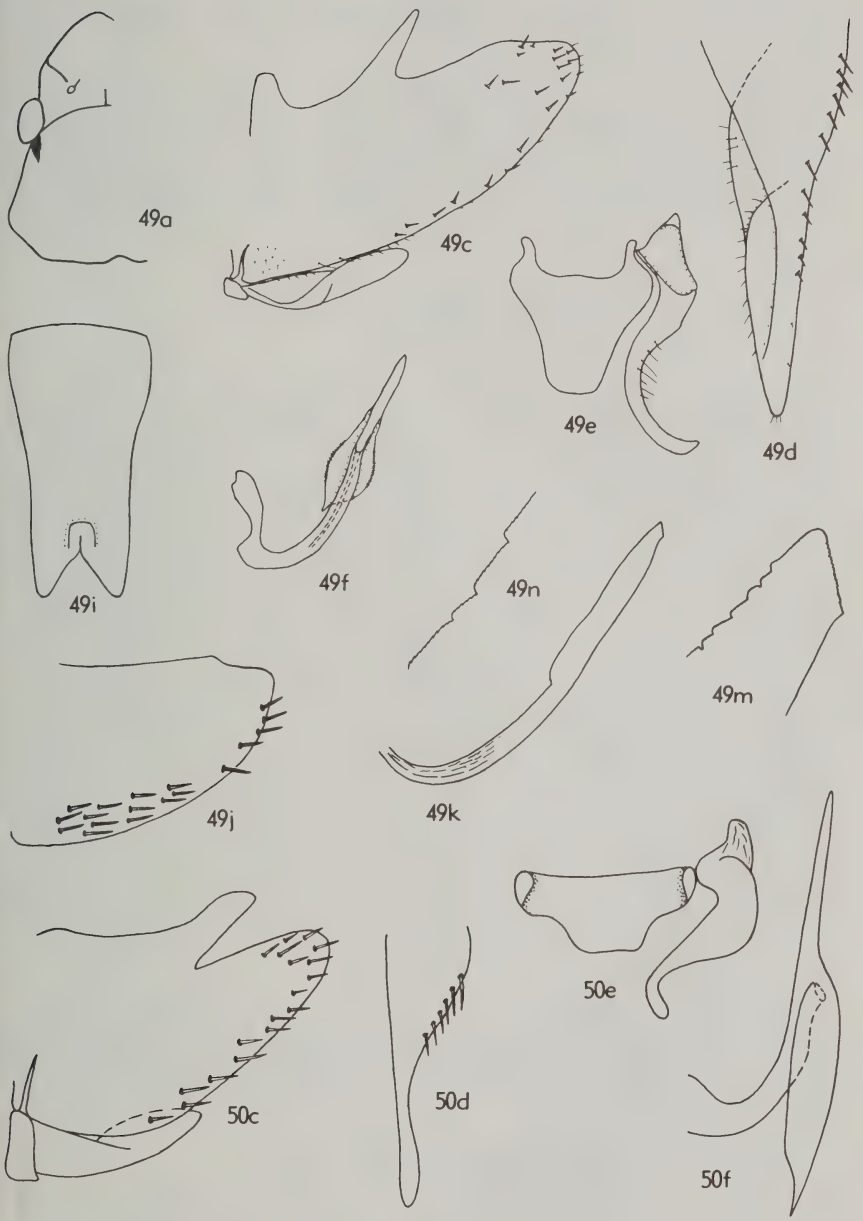
9. Aedeagus with dependent process acute apically ..... *pruinosa* (Walker) (fig. 57)
   Aedeagus with dependent process truncate apically ..... *quadrimacula* (Walker) (fig. 58)

Apulia punicea, NEW SPECIES

FIGURE 50

Length of male 15.9 mm. Head proportions as in *A. resupinata*, n. sp. (p. 92), anterior margin rounded in dorsal view, with a short carina on median portion of transition from crown to face (type) or completely without such a carina, surface of crown without a median fovea, with a shallow concavity laterad of each ocellus, lateral clypeal sutures attaining ocelli; antennal ledges with anterior margins rectilinear in lateral view, each ledge with a slight concavity in dorsal view; face convex in profile. Pronotum with hind margin steeply declivous, concave medially or not (type), disk rugose and punctate; forewing with membrane including all of apical cells, veins indistinct, with supernumerary anteapical cross veins; hindleg with length of first tarsomere greater than combined length of second and third tarsomeres. Male with pygofer not strongly produced, with an anteapical posterodorsal projection which is not differentially sclerotized, with macrosetae submarginal along apical and posteroventral margin; plates each abruptly narrowed at midlength, not extending nearly as far posteriorly as pygofer apex, with uniseriate macrosetae; style short, apical portion curved posterolaterally, extremity rounded; connective somewhat U-shaped with apex flattened, not carinate dorsally; aedeagus with an elongate slender dorsal acuminate process and with dependent process slender and elongate, broader than dorsal process, extending basally beyond basal curvature of aedeagal shaft, abruptly narrowed and acute apically; paraphyses absent. Female unknown. Other structural characters as in generic description.

Color of dorsum purple to purplish brown (type), a narrow oblique band on each wing extending posterolaterally from apex of scutellum to near middle of costal margin, and another band extending anterolaterally, from apex of clavus to costal margin in apical half; face and legs more or less concolorous with dorsum, with a paler area on each side of upper portion of clypeus, across muscle impressions.



FIGURES 49, 50.—49, *Apulia excelsa* Distant (*a, c-f,* from specimen from Bolivia; *i* from lectotype; *j, k, m, n* from specimen from Yungas de la Paz, Bolivia). 50, *A. punicea,* n. sp. (specimen from Baños, Ecuador; only apex of aedeagus shown in *g*).

Holotype male, "Abitagua", Ecuador, 1200 meters, May 25, 1939 (W. Clark-Macintyre) and one male, Baños, Ecuador (NCS). Holotype on indefinite loan to USNM.

A. punicea, n. sp., is similar externally to *A. hyala* Distant (of which males are unknown) but is larger than either of the two available females of the latter. The pygofer of *punicea* is somewhat similar to that of *A. excelsa* Distant, but is less strongly produced. The dependent aedeagal process of *excelsa* is shorter and broader than in *punicea* and does not extend basally as far as the curvature of the shaft.

Apulia revoluta, NEW SPECIES

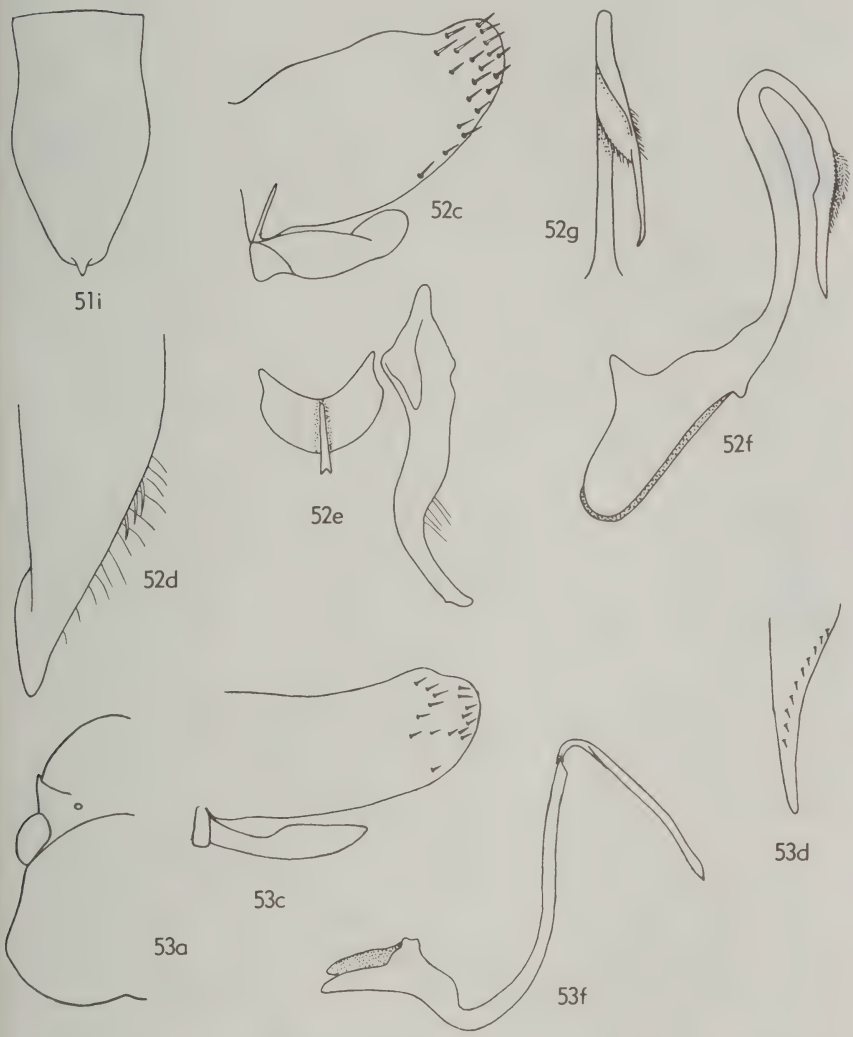
FIGURE 52

Length of male 16.0 mm. Head with median length of crown approximately eight-tenths interocular width and almost six-tenths transocular width, anterior margin narrowly rounded in dorsal view, without a carina at transition from crown to face, without a median coronal fovea, lateral clypeal sutures not attaining ocelli; antennal ledges each with anterior margin convex in lateral view; face slightly flattened medially. Pronotum with posterior margin declivous, concave medially, disk punctate and weakly rugose; forewing with membrane including only inner apical cell, veins indistinct, with a number of anteapical supernumerary crossveins; hindleg with length of first tarsomere approximately equal to combined length of second and third tarsomeres. Male pygofer not strongly produced, apex broadly rounded, with a number of regularly spaced anteapical and apical macrosetae, without processes; plates triangular, not extending posteriorly nearly as far as pygofer apex, with a few uniseriate macrosetae near midlength; style extending posteriorly much farther than apex of connective, without distinct preapical lobe, apical portion directed posterolaterally, extremity convex; connective broadly U-shaped with a strong median carina; aedeagus elongate, slender, in lateral view, with dependent process recurved and lying parallel to aedeagal shaft, with numerous minute close-set setae near midlength of dependent process; paraphyses absent. Female unknown. Other structural characters as in generic description.

Color of crown, apical portion of scutellum, and commissural border of clavus, reddish purple, remainder of dorsum yellow, pronotum tinged with purplish, wings with a few irregular black discal markings in apical half; face concolorous with crown except genal margins which are yellow, legs with femoral apices and tarsi black.

Holotype male, "Chaco", Bolivia (RMS).

The male genitalia of *A. revoluta*, n. sp., are very similar to those of *A. grisea*, n. sp. (below), but differ in the form of the aedeagus which is less strongly curved at the base in *revoluta*, and with the dependent process tending to diverge from the aedeagal shaft in lateral view in *grisea*.

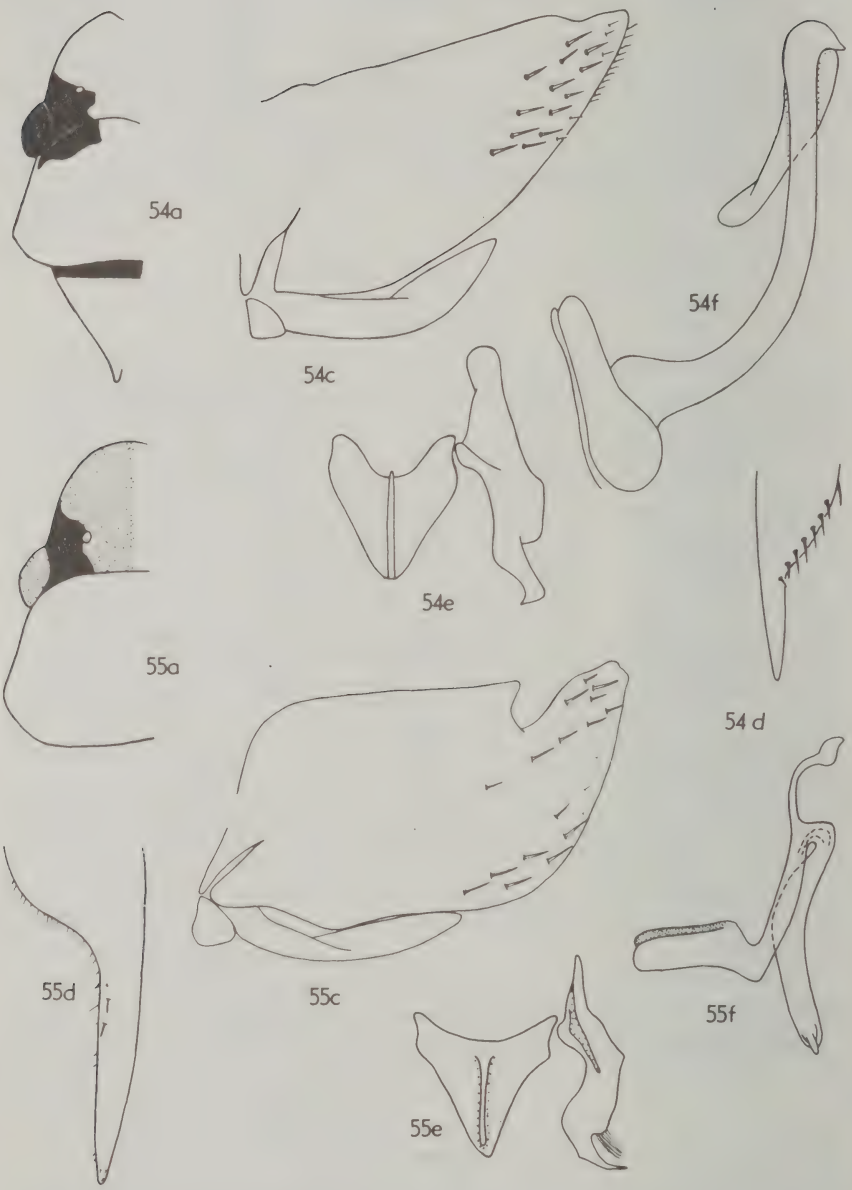


FIGURES 51-53.—51, *Apulia hyala* Distant, lectotype. 52, *A. revoluta*, n. sp., holotype (only shaft of aedeagus shown in *g*). 53, *A. grisea*, n. sp., holotype.

Apulia grisea, NEW SPECIES

FIGURE 53

Length of male 15.9 mm. Head with median length of crown three-fourths interocular width and slightly greater than one-half transocular width, anterior margin broadly rounded in dorsal view, with a very short carina at transition from crown to face; antennal ledges each with anterior margin rectilinear in lateral view. Forewing with membrane including inner apical



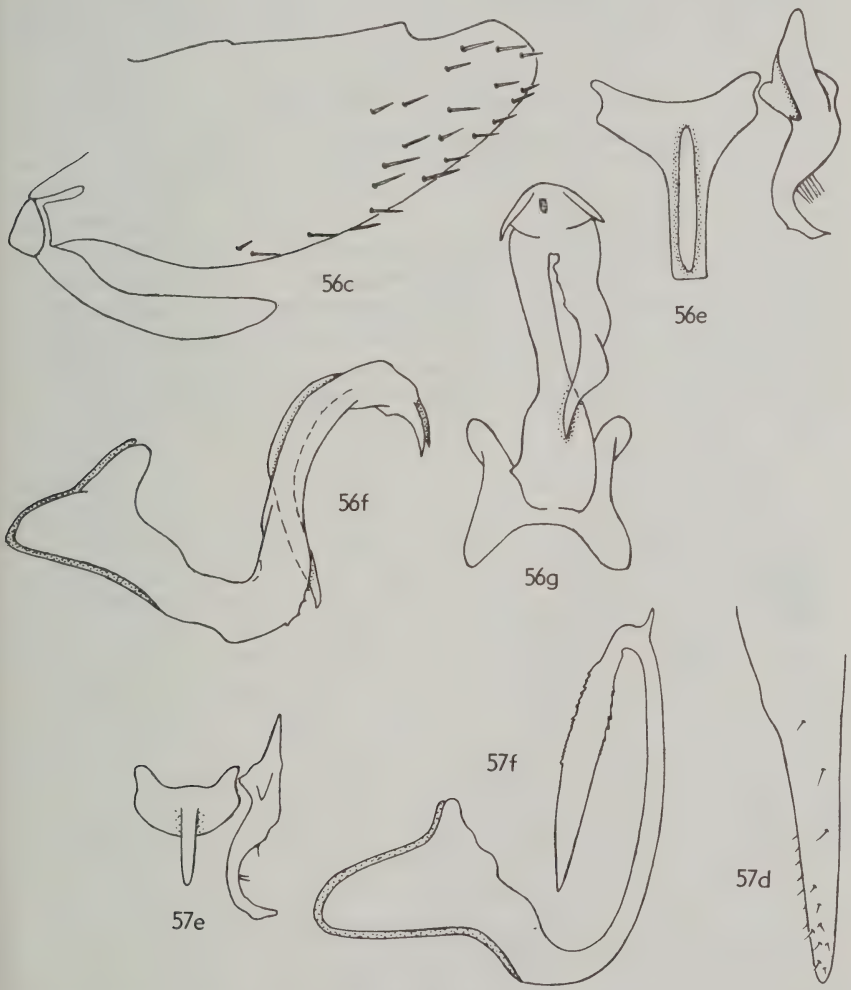
FIGURES 54, 55.—54, *Apulia flora* Distant, lectotype. 55, *A. resupinata*, n. sp., holotype.

cell and apical portions of remaining apical cells; hindleg with tarsi missing. Male genitalia much as *A. revoluta,* n. sp., except aedeagus which is more strongly curved at base than in *revoluta,* and with the dependent process extending ventrally, not recurved as in *revoluta.* Female unknown. Other structural characters as in *A. revoluta,* n. sp.

Color entirely grayish tan dorsally; face darker brown in lower half, remainder of venter and legs more or less concolorous with dorsum.

Holotype male, Colombia, on indefinite loan to USNM from NCS.

A. grisea, n. sp., is closely related to *A. revoluta,* n. sp., in the discussion of which distinguishing characters are mentioned.



FIGURES 56, 57.—56, *Apulia elongata* (Signoret) (from specimen from Baños, Ecuador). 57, *A. pruinosa* (Walker), holotype.

Apulia resupinata, NEW SPECIES

FIGURE 55

Length of male 14.4 mm. Head with median length three-fourths interocular width and slightly more than one-half transocular width, with a carina at median portion of transition from crown to face, crown with a broad median shallow fovea, with a concavity laterad of each ocellus, lateral clypeal sutures not attaining ocelli; antennal ledges with anterior margins rectilinear in lateral view, face slightly flattened medially. Pronotum with posterior margin not declivous, slightly concave medially, disk punctate; forewings (apices damaged) with a narrow apical membrane, veins indistinct, without an anteapical plexus of veins; hindleg with length of first tarsomere greater than combined length of second and third tarsomeres. Male pygofer strongly produced posteriorly, with a dorsal anteapical deep emargination, with macrosetae sparse and located on posterior half of disk, without processes; plates triangular, abruptly narrowed near midlength, apical portion gradually tapered, not extending nearly as far posteriorly as pygofer apex, with very few small macrosetae; style extending posteriorly slightly farther than apex of connective, with distinct preapical lobe, apical portion directed posteriorly and with a slight median angle at apex; connective Y-shaped, with stem gradually widened to arms, carinate medially; aedeagus with a slender process arising at base of dependent process, extending dorsally and slightly posteriorly and expanded apically, dependent process extending anteroventrally considerably beyond base of shaft, abruptly narrowed at apex; paraphyses absent. Female unknown. Other structural characters as in generic description.

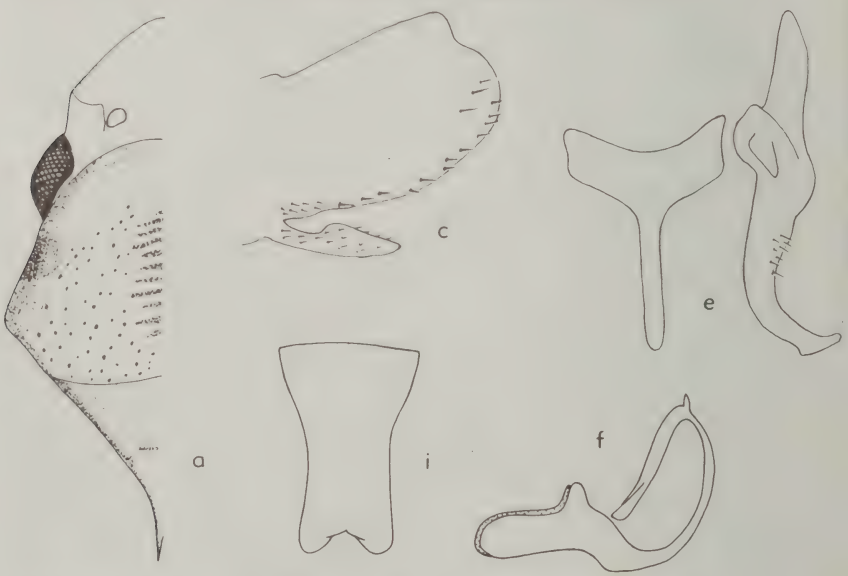


FIGURE 58.—*Apulia quadrimacula* (Walker) (*f* from specimen from unknown locality; *i* from holotype; remainder from specimen from Baños, Ecuador).

Color of crown purplish, ocellocular areas black, pronotum and scutellum yellow except basal and apical portions of latter which are red; wings black, a vitta along base of inner claval vein giving off two transverse branches to claval suture, yellow, claval suture pale, membrane pale; face concolorous with crown in basal one-third of clypeus, lower two-thirds of clypeus black, remainder gray except genal margins which are broadly yellow; legs yellow, tarsi pink, apical half of posterior tibiae gray.

Holotype male, Santa Isabel, Cuzco, Peru, November 30, 1951 (F. L. Woytkowsky) on indefinite loan to USNM from NCS.

A. resupinata, n. sp. is closely related to *A. elongata* (Signoret), but differs markedly in the structure of the aedeagus which has paired shorter processes in addition to the dependent process.

13. Genus ZARUMA Melichar

Figures 59-65

Zaruma Melichar, 1926a:347. Type-species: *Zaruma vexata* Melichar, by original designation.

Length of male 12.4-13.7 mm, of female 12.2-14.0 mm.

Head moderately produced, median length of crown varying from slightly less than six-tenths to three-fourths interocular width and from slightly less than four-tenths to slightly less than five-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, crown with a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and usually attaining ocelli (sutures obscure in some specimens); antennal ledges protuberant or not, in lateral view with anterior margins oblique and rectilinear or slightly convex; clypeus slightly flattened, muscle impressions not very distinct, face finely pubescent below, transclypeal suture obscure medially, clypellus not strongly produced, but profile of its lower portion curved more abruptly posteriorly than remainder of contour of face.

Thorax with pronotal width greater than transocular width of head, lateral margins strongly convergent anteriorly, dorsopleural carinae complete, posterior margin rectilinear or slightly concave, disk transversely rugose, not pubescent; scutellum usually not striate behind transverse sulcus. Forewing with membrane including inner apical cell and apical portions of remaining apical cells, veins not very distinct, not elevated, usually with four apical cells and no supernumerary anteapical cells, but occasionally with a fifth apical cell and one or more supernumerary anteapical cells, base of outer apical cell located more proximally than base of third apical cell, texture translucent except membrane, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia (males unknown in *Zaruma decepta*, n. sp., and *Z. purpurea*, n. sp.): Pygofer strongly produced posteriorly, apex usually subtruncate, broadly convex, or narrowly convex, macrosetae few and usually located near apex. Plates short, triangular, not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae. Style extending posteriorly farther than apex of connective, without a preapical lobe. Connective Y-shaped with the stem broad. Aedeagus slender, extending posterodorsally, with elongate paired basal processes or none. Paraphyses present or absent.

Female abdominal sternum VII elongate, gradually tapering in apical portion to apex which is usually acute, rarely broadly rounded but then with a small acute ventral lobe. Dorsal membrane of genital chamber with a suboval sclerite on each side near anterior end. Ovipositor with second valvulae each narrow in basal portion, broader in apical three-fourths and with numerous fairly small quadrate dorsal teeth each with secondary denticles, with a number of anteapical dorsal and ventral denticles near acute apex. Pygofer with a few multiseriate anteapical macrosetae and a sparse group of macrosetae extending anteroventrally from these parallel to posteroventral pygofer margin.

Specimens of *Zaruma* Melichar have been studied from Ecuador, Peru, and Bolivia. The specimens are sordid yellow with variable amounts of purple markings. Externally, species of *Zaruma* are very similar to *Abana* Distant, in the Proconiini and have been so misdetermined in some collections.

Zaruma is closely related to *Apulia* Distant in general appearance and in the structure of the second valvulae of the ovipositor. Distinguishing characters are discussed under *Apulia* (above).

In the key below, I have assumed that the female of *Zaruma achitepa*, n. sp., would be marked like the male.

SPECIES OF *ZARUMA*

achitepa, n. sp. Peru.
decepta, n. sp. Bolivia.
decolorata, n. sp. Peru, Bolivia.
purpurea, n. sp. Bolivia.
regilla, n. sp. Bolivia.
vexata Melichar, 1926a:348. Ecuador.

KEY TO FEMALES OF *ZARUMA*

(*Z. vexata* Melichar, known only from male (fig. 65) not included)

1. Pronotum black with a pale median design ..... *achitepa*, n. sp.
   Pronotum not black 2

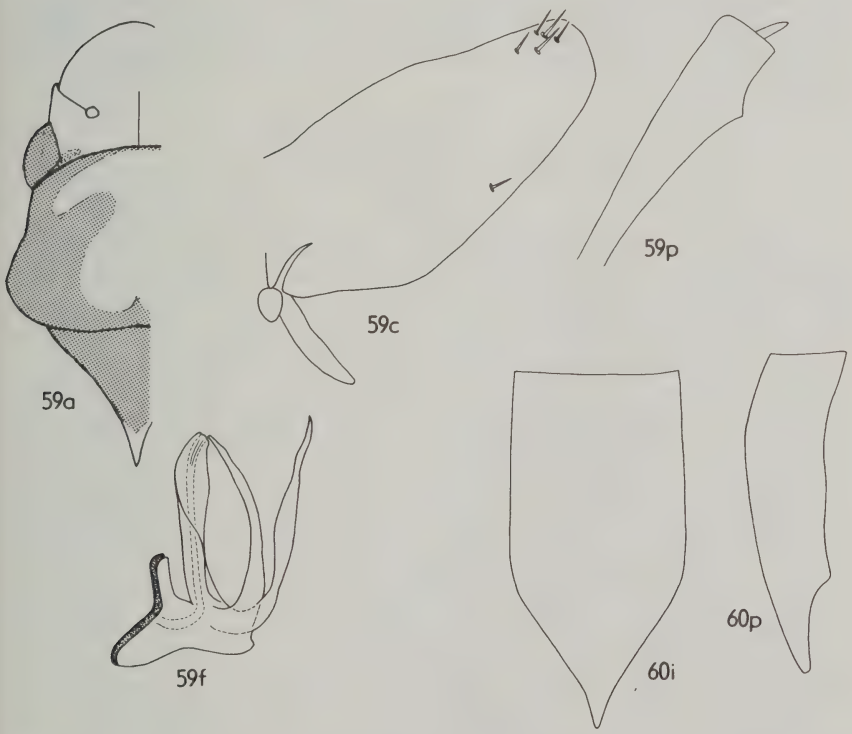
2. Purple markings of forewings consisting of a broad longitudinal costal stripe and a transverse band through anteapical cells
   decolorata, n. sp., page 97
   Purple markings more extensive 3

3. Forewing uniform purple from base to middle of anteapical cells *decepta,* n. sp., page 96
   Forewing with areas of purple, not uniformly purple, before middle of anteapical cells 4
4. Female abdominal sternum VII entirely black ..... *regilla,* n. sp., page 99
   Female abdominal sternum VII not completely black *purpurea,* n. sp., page 99

Zaruma achitepa, NEW SPECIES

FIGURE 59

Length of female 12.7 mm, male unknown. Head with median length of crown two-thirds interocular width and slightly less than one-half transocular width, antennal ledges protuberant in dorsal view, in lateral view with their anterior margins rectilinear. Pronotum with posterior margin slightly concave; forewing with four apical cells and without supernumerary anteapical cells. Male pygofer with apex broadly convex, with a very small group of



FIGURES 59, 60.—59, *Zaruma achitepa,* n. sp., holotype: *p,* Anal tube, from lateral view. 60, *Z. decepta,* n. sp., holotype (*in situ*): *p,* Female abdominal sternum VII from lateral view.

macrosetae before apex dorsally and a single setae near middle of posteroventral margin; aedeagus slightly broadened anteapically in lateral view, with a pair of asymmetrical processes arising at base of shaft, each extending dorsally as far as apex of shaft and acute apically. Anal tube with a slight convexity on ventral surface in apical half. Female unknown.

Color of head dull yellow with an oval black spot extending mesad from each posteromesal eye angle; pronotum fuscous with a median dull yellow inverted anchor-shaped spot; scutellum black with apex dull yellow; forewings uniform purple from base to anteapical cells, with a translucent white area in base of inner apical cell and adjoining anteapical cell and two contiguous similar white areas, one in outer anteapical cell and one in costal area, with anteapical transverse area fumose; face yellow, with a vertical black area extending ventrally from each eye over gena and lorum onto clypellus, with a black area on proepimeron beneath dorsopleural carina, mesothoracic anepisternum, apices of all tibiae, and all tarsi smoky, remainder of pleura, venter, and legs yellow.

Holotype male, Pachitea, Peru (MMB). The pin bears a manuscript name presumably attached by Melichar. Female unknown.

Zaruma achitepa, n. sp., is similar to *Z. decolorata,* n. sp., from which it differs in the shape of the aedeagal shaft and aedeagal processes, in the darker pronotum and scutellum, and in the uniformly purple anterior portions of the forewings.

Zaruma decepta, NEW SPECIES

FIGURE 60

Length of female 12.2-13.5 mm. Head with median length of crown varying from slightly less than six-tenths to approximately two-thirds interocular width and from slightly more than one-third to more than four-tenths transocular width, antennal ledges slightly protuberant in dorsal view, in lateral view with anterior margins rectilinear. Pronotum with posterior margin slightly concave; forewing with four or five apical cells and in some specimens with one or a few supernumerary anteapical cells. Male unknown. Female abdominal sternum VII gradually narrowed in apical one-fourth to acute apex.

Color of head dull yellow except a narrow black area behind each eye, pronotum yellow with four black spots in a transverse row across disk and a dark area behind each eye; scutellum yellow with a transverse dark basal band giving off a narrow median posterior branch which is broadened at its apex in middle of scutellum; forewings colored as in *Z. achitepa,* n. sp., except that anteapical translucent area forms a transverse band of variable width and includes a few variable fuscous markings; face as in *achitepa,* with or without a black area on proepimeron beneath dorsopleural carina, mesothoracic episternum fumose, apices of all tibiae and all of tarsi smoky, remainder of legs and thoracic venter yellow; discal portion of female abdominal sternum VII, and occasionally all or part of remainder of abdominal venter, dark.

Holotype female, Ixiamus, Bolivia, December, 1921 (W. M. Mann), Mulford Biological Exploration, and one female, Tumupasa, Bolivia, 1921, other

data as in preceding specimen (USNM). One female, Coroico, Bolivia and one female San Antonio, Bolivia (RMS). Two females, Coroico, Bolivia and one female, "Yungas", Bolivia (MMB). One female, Songo, Bolivia (ZIL).

Zaruma decepta, n. sp., is the only species with uniformly purple forewings except *Z. achitepa,* which has a distinctly marked pronotum (see description, above) and a darker scutellum.

Zaruma decolorata, NEW SPECIES

FIGURES 61, 62

Length of male 13.3-13.7 mm, of female 12.9-13.6 mm. Head with median length of crown from six-tenths to slightly less than three-fourths interocular width and from four-tenths to almost one-half transocular width, antennal

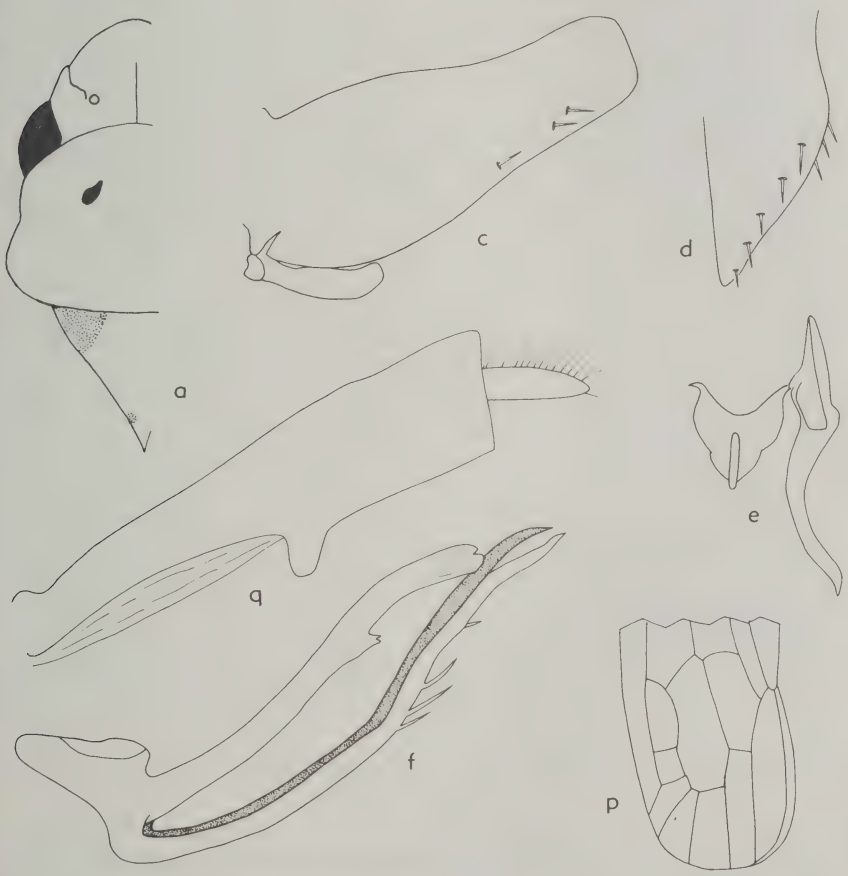


FIGURE 61.—*Zaruma decolorata,* n. sp., male (*a, c-f, q,* from specimen from Coroico, Bolivia; *p* from Callanga, Peru): *p,* Forewing apex; *q,* anal tube from lateral view.

ledges slightly protuberant in dorsal view, in lateral view with anterior margins rectilinear or convex. Pronotum with posterior margin slightly concave; forewing with more than four apical cells and usually with one or more supernumerary anteapical cells. Male pygofer very strongly produced with apex truncate, with a few short macrosetae near apex of posterodorsal margin and a few on posteroventral margin near its midlength; aedeagus with shaft very slenderly elongate cylindrical, curved slightly ventrally in apical half, with a short median ventral process beyond midlength, paired processes arising at base of shaft, slender, extending posteriorly beyond apex of shaft, each with short, slender, acute branches in its apical half and each acute apically. Anal tube with a short convex ventral process in apical half. Female abdominal sternum VII with apex rounded posteriorly and with a minute ventral lobe.

Color of head and pronotum yellow, with a pair of discal black spots on pronotum; scutellum yellow with basal angles and a small anteapical spot on each side before apex, fuscous; forewings dull yellow with a broad stripe on corium parallel to costal margin and extending posteriorly almost to bases of anteapical cells and an arcuate transverse band through anteapical cells, purple; face with black markings as in *Z. achitepa*, n. sp. (above); thoracic pleura, venter, and legs yellow except tarsi which are smoky.

Holotype male, Callanga, Peru; one female, Yungas de la Paz, Bolivia and one female, same locality, 1000 m. (MMB). One female, same data as last preceding (OSU). One female, Yungas de la Paz, Bolivia and one female, Callanga, Peru (USNM).

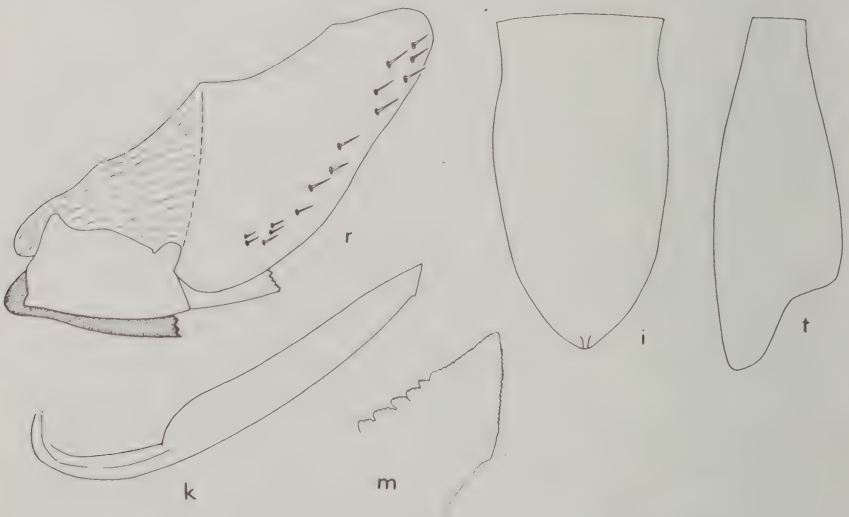


FIGURE 62.—*Zaruma decolorata*, n. sp. female (*i*, *t*, specimen from Yungas de la Paz, Bolivia, *in situ;* remainder from Callanga, Peru); *r*, Pygofer, first valvifer, base of first valvula (shaded) and basal portion of second valvula; *t*, abdominal sternum VII from lateral view.

Z. decolorata, n. sp., differs from all other species in the genus in its elongate aedeagal shaft and the ornate processes in the male and in the rounded apex of the female abdominal sternum VII.

Zaruma regilla, NEW SPECIES

FIGURE 63

Length of male 11.9-13.0 mm, of female 12.3-12.6 mm. Head with median length varying from slightly less than two-thirds to seven-tenths interocular width, and four-tenths or slightly more than four-tenths transocular width, antennal ledges slightly protuberant in dorsal view, in lateral view with their anterior margins rectilinear. Pronotum with posterior margin slightly concave; forewing with four or more apical cells and with or without supernumerary anteapical cells. Male pygofer with apex broadly convex with a small group of anteapical macrosetae and a few widely spaced setae along posteroventral margin; aedeagus broadened at apex, with a pair of almost symmetrical processes arising at base, tapered and acute apically, extending dorsally almost as far as apex of aedeagal shaft. Anal tube with a pair of short lateroventral angular protuberances slightly beyond midlength. Female with abdominal sternum VII more abruptly tapered than in other species of the genus, apex obtusangulate.

Color of crown and pronotum sordid yellow, pronotum with a pair of dark spots with diffuse edges before middle of disk and a paler dark area on each side near lateral margin, the two spots on each side occasionally confluent, usually with a black spot on anterior margin behind each eye; forewing mostly pale purplish with darker purple markings that are not very distinct, but are more extensive than in *Z. decolorata,* n. sp. (above); face as in *Z. achitepa,* n. sp. (above); thoracic pleura without a dark area below dorsopleural carina, mesepisternum dark, remainder pale, legs pale except dark tarsi; female abdominal venter pale except sternum VII which is contrastingly black, male abdomen much darker.

Holotype and one additional male and one female, Coroico, Bolivia (OSU). One male, Coroica, Bolivia; one male Yungas de la Paz, Bolivia, 1000 m.; one female, Yungas, Bolivia (MMB).

Z. regilla is similar to *Z. achitepa,* n. sp., in the structure of the male genitalia, but the aedeagus is broadest apically, in lateral view, instead of anteapically as in *achitepa.* The black female abdominal sternum VII of *regilla* differs from all other species in the genus.

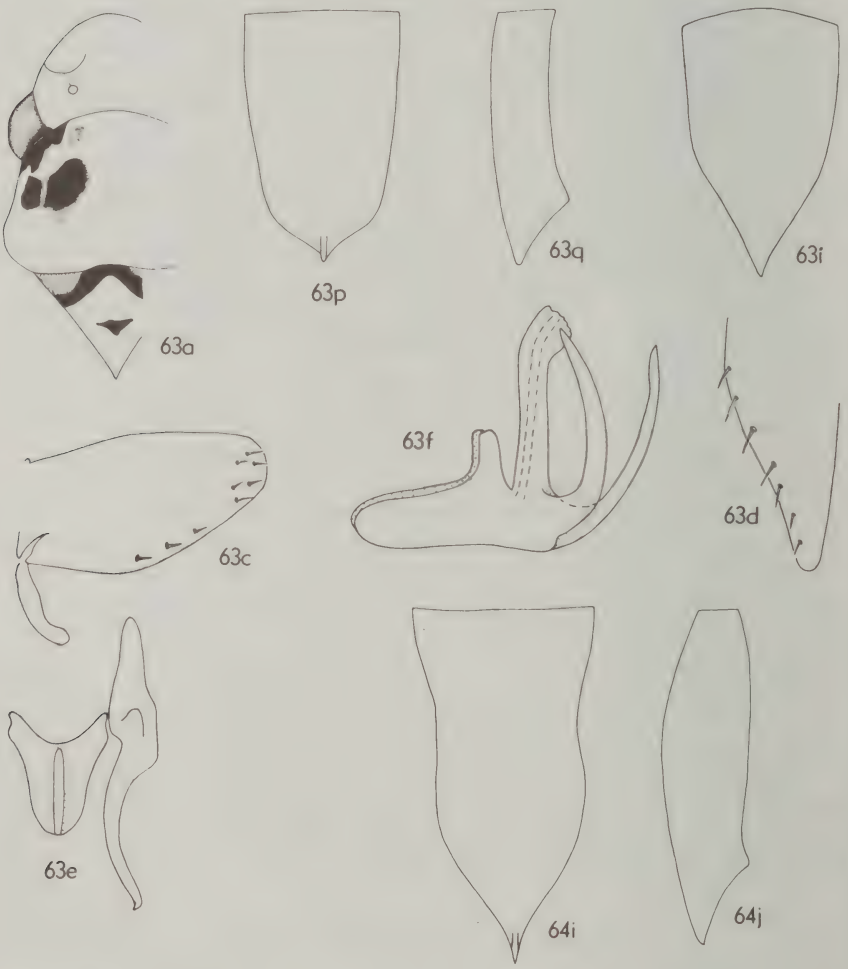
Zaruma purpurea, NEW SPECIES

FIGURE 64

Length of female 12.6-14.0 mm. Head with median length of crown from slightly more than six-tenths to approximately two-thirds interocular width, and slightly more than four-tenths transocular width, antennal ledges slightly protuberant in dorsal view, in lateral view with their anterior margins convex

or rectilinear. Pronotum with posterior margin slightly concave; forewing usually with more than four apical cells and with supernumerary anteapical cells. Male unknown. Female abdominal sternum VII gradually narrowed in apical one-fourth to acute apex.

Head and pronotum dull yellow, a narrow black area behind eye along posterior margin of head, occasionally extending mesally a short distance beyond inner eye margin; pronotum with a pair of discal black spots in anterior



FIGURES 63, 64.—63, *Zaruma regilla*, n. sp. (*p* and *q*, from specimen from Yungas, Bolivia, *in situ;* remainder from Coroico, Bolivia; sternum IX not shown in *c; i in situ*): *p*, Female abdominal sternum VII from ventral view; *q*, the same from lateral view. 64, *Z. purpurea*, n. sp., holotype: *j*, Female abdominal sternum VII from lateral view.

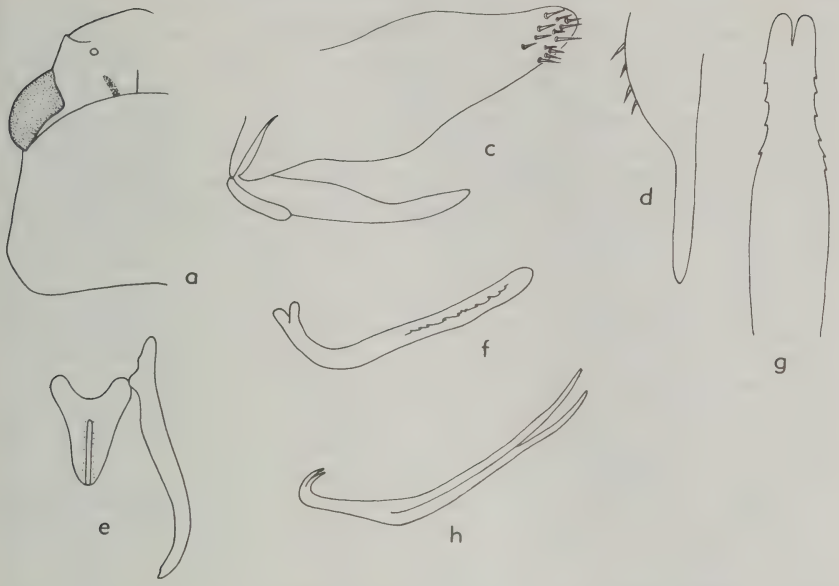


FIGURE 65.—*Zaruma vexata* Melichar, lectotype (basal portion of aedeagus not shown in *g; h* from lateral view).

half, and with variable fumose areas near lateral margins or bordering anterior margin; scutellum with anterior margin dark, delimiting a median bilobed pale area with a black mark at its center covering remainder of scutellar surface; forewing grayish with variable areas of dark purple usually in corium parallel to costal margin in its basal two-thirds, in basal half of clavus parallel to claval suture but expanded mesally at apex, and transversely through anteapical cells; face as in *Z. achitepa,* n. sp., without a dark area on proepimeron beneath dorsopleural carina, mesepisternum dark, remainder of pleura, legs and abdominal venter pale except for darker tarsi and a dark discal area on female abdominal sternum VII.

Holotype female, Yungas de la Paz, Bolivia; one female, Coroico, Bolivia, and one female "Peru" (F. Woytkowski) (OSU). Two females, Coroico, Bolivia and one, Mapiri, "Peru" [Bolivia], one female, "Bolivia" (MMB). Two females, one without label and one with label illegible (RMS).

Z. purpurea, n. sp., is very similar in appearance to *Z. decolorata,* n. sp., but is more extensively marked than *decolorata.*

14. TETTISELVA, NEW GENUS

FIGURE 66

Type-species: *Tettiselva pedia,* n. sp.

Length 12.0-13.0 mm.

Head slightly produced, median length of crown from less to slightly more than one-half interocular width and less than one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition

from crown to face, ocelli located slightly behind a line between anterior eye angles, each closer to adjacent eye angle than to median line, crown with a broad shallow median depression, without sculpturing or with lenticular impressions, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins slightly oblique and almost rectilinear; clypeus broadly flattened medially, muscle impressions not very distinct, transclypeal suture entire, clypellus with weak pubescence apically, in profile abruptly curved posteroventrally in its apical two-thirds.

Thorax with pronotal width slightly less than transocular width of head, lateral margins slightly divergent posteriorly, dorsopleural carinae complete, posterior margin concave, surface transversely rugulose in posterior half, not pubescent; scutellum weakly transversely striate in posterior half. Forewing with membrane including all of apical cells, veins elevated and distinct, with four apical cells, the base of fourth not more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing or weakly punctate; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere exceeding combined length of two more distal tarsomeres, with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced and truncate apically, macrosetae short, parallel to posterior margin and on posteroventral margin. Plates very short, triangular, not extending nearly as far posteriorly as pygofer apex, with multiseriate macrosetae. Style very short, broad, not extending as far posteriorly as apex of connective, without preapical lobe, apex irregular in outline. Connective Y-shaped, the arms strongly divergent but short, with a strong keel. Aedeagus slender, bifid basally, bilobed apically. Paraphyses absent.

Female abdominal sternum VII with a conspicuous elongate process arising from ventral surface near base, extending posteriorly much beyond posterior margin of sternum VII, which is concave medially, strongly convex laterally, and partially telescoped beneath sternum VI to the extent that in dried specimens only the lateral lobes and the median process are visible. Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvulae each broadened beyond basal curvature, with dorsal margin convex and bearing sloping primary teeth, each with small secondary teeth, except a short apical portion which, like the apicoventral margin, bears minute denticles. Pygofer with few short anteapical macrosetae and a few near upper portion of caudoventral margin.

Tettiselva, new genus, is known only from the type-species of which specimens have been studied from Ecuador and Peru. *Tettiselva* is similar to *Zaruma* Melichar in the form of the pygofer and the short plates of the male, and in the produced sternum VII of the female, but the relationship is probably not nearly as close as that between *Zaruma* and *Apulia* Distant.

Tettiselva pedia, NEW SPECIES

FIGURE 66

Length of male 12.0-13.0 mm, of female 12.5-13.0 mm. Structural characters as in generic description. Color of dorsum brown, forewings castaneous, with usually (type) yellow markings but which may be sordid red, which are variable but usually forming three transverse stripes of changing width, the anterior two visible in corium and occasionally extending onto clavus, the posterior one complete (type) and reaching commissural margin at claval apex or represented only by a few irregular vittae, some specimens (type) with additional yellow dots and irrorations on forewings. Face, pleura, and venter, brown; legs very dark brown.

Holotype male, Río Santiago, Peru, November 7, 1924; one topotypic female, November 5, 1924; one male and one female, Upper Río Marañon, Peru, December 9, 1924 and September 19, 1924 respectively; one male, Achinamiza, Peru, December 24, 1925 (AMNH). One female, Normandia, Ecuador (MMB). Two females, Abitagua, Ecuador, 1200 meters, May 25, 1939 (W. Clark-Macintyre) (NCS).

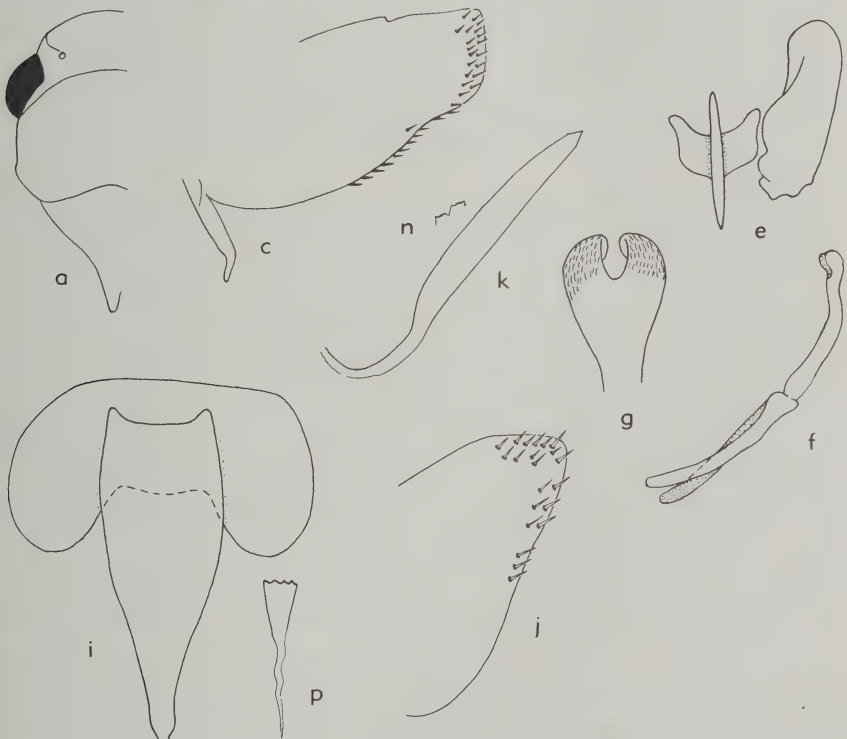


FIGURE 66.—*Tettiselva pedia,* n. sp. (male specimen and *i,* from Upper Río Marañon, Peru; only apex of aedeagus shown in *g;* apex of abdominal sternum VII broken off in *i*): *p,* Apex only of sternum VII.

15. Genus DILOBOPTERUS Signoret

Figures 67-114

Dilobopterus Signoret, 1850b:254. Type-species: *Dilobopterus decoratus* Signoret, by subsequent designation of Osborn, 1926b:172.

Pseudoscarta Melichar, 1926a:341. Type-species: *Cicada fastuosa* Fabricius, by subsequent designation of China, 1938d:183. New synonymy.

Marizella Schmidt, 1928c:82. Type-species. *Marizella polita* Schmidt, by original designation. New synonymy.

Length of male 6.6-14.8 mm, of female 7.5-16.0 mm.

Head varying from slightly to moderately produced, its median length from three-tenths to three-fourths its interocular width and from one-fifth to slightly more than four-tenths transocular width, anterior margin nearly always broadly rounded in dorsal aspect, rarely (*D. jemima* (Distant), *D. syrphoidula* (Jacobi)) subangulate, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles in most species, rarely on a line between anterior eye angles, variable interspecifically as to relative distance from midline of crown and adjacent anterior eye angle, surface of crown convex or with a slight concavity near midlength, disk without sculpturing or setae, lateral clypeal sutures extending onto crown, often not attaining ocelli; antennal ledges with anterior margins obliquely convex or obliquely rectilinear in lateral view; face convex, very finely pubescent ventrally, muscle impressions distinct, transclypeal suture nearly always incomplete (complete in lectotype of *Tettigonia corixoides* Fowler), clypellus slightly swollen, not strongly produced.

Thorax with pronotal width less than transocular width of head, lateral margins subparallel or slightly convergent posteriorly, dorsopleural carinae oblique and complete; posterior margin concave; surface without sculpturing or transversely rugose, without pubescence; posterior half of scutellum not transversely striate. Forewing membranous apically and in most species with a considerable membranous area before anteapical cells, veins distinct apically, distinct or not anteapically, not elevated, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture hyaline (exception: *D. gaudens* (Walker)) with coriaceous areas in most species; wings of female at rest exceeding apex of ovipositor. Hindwing much shorter than forewing, with or without a conspicuously enlarged jugal lobe partially separated from remainder of wing by a deep excision. Hindleg with meron exposed, at least in male, with forewing in rest position; femoral setal formula 2:1:1 or 2:1:1:1; first tarsomere with length much greater than combined length of second and third tarsomeres, with biseriate minute macrosetae on plantar surface.

Male genitalia: Pygofer well produced or not, with macrosetae numerous, regularly dispersed or not, processes usually absent, not differentially sclerotized when present. Plates triangular, separate throughout their length or very rarely fused for a very short distance at their bases, with longitudinally uniseriate or multiseriate macrosetae and with at least a few elongate microsetae on lateral margins. Style with length relative to connective variable interspecifically, with or without distinct preapical lobe. Con-

nective Y- or T-shaped (nearly a transverse bar in *D. gaudens* (Walker)), with or without median keel. Aedeagus symmetrical or not, with or without processes, but processes usually not paired when present. Paraphyses present (exception: *D. corixoides* (Fowler)), paired or unpaired, symmetrical or not, somewhat variable in some species.

Female (fig. 96) abdominal sternum VII with posterior margin varying interspecifically from broadly and very shallowly concave to well produced posteriorly. Ovipositor with second valvulae each expanded throughout length beyond basal curvature and bearing teeth on apical three-fourths of expanded portion, its ventral margin convex throughout expanded portion, primary teeth quadrate, sloping and bearing minute secondaries, with numerous anteapical denticulations on dorsal and apicoventral margins, with an anteapical ventral angle. Pygofer produced and broadly rounded, with numerous macrosetae of varying size on apical one-half.

The genus *Dilobopterus* Signoret occurs from Mexico and the West Indies through all of Central and South America to Argentina. *Dilobopterus* is probably related to *Amblyscartidia,* new genus, in the discussion of which similarities and differences are discussed. It is much closer to *Lissoscarta* Stål in many respects, in both males and females, but it can be separated readily from *Lissoscarta* by the lack of a constriction at the base of the abdomen.

Consistent characters have not been found to separate *Pseudoscarta* from *Dilobopterus,* although a number of species formerly included in each of these nominal genera can be relegated easily to one or the other, the larger, yellower species with a more produced head to *Pseudoscarta,* the shorter darker species with a more rounded head to *Dilobopterus.* But such a separation does not result in placing together all of the species with an axillary lobe in the hindwing, moreover *syrphoidulus* (Jacobi) and *obliquatulus* (Jacobi) are intermediate in appearance and in the former the females are golden while the males are dark. Separation of the two genera on the basis of the enlarged jugal lobes alone also seems to result in unnatural groups — for example *hyalinatulus* (Osborn) would be placed in *Pseudoscarta,* but the genitalia of this species are very close to those of *selvanus,* n. sp., which would have to be placed in *Dilobopterus.* Signoret himself (1850b) recognized the difficulties presented by annectant forms. In speaking of his new species *trifasciatus,* in the paper in which he described the genus *Dilobopterus*: "The appendix [jugal lobe] is developed but not detached and this species would form the transition from this genus to *Tettigonia* . . . ." [Young's translation.]

Dilobopterus spectabilis (Distant) is placed in synonymy in the list below as a result of comparison of the accompanying illustration of the female lectotype of the Distant nominal species with specimens associated with males of *D. auctulus* (Jacobi) by the present author.

The genitalia of the male lectotype of *Tettigoniella bracteatulus* Jacobi are closely similar to the accompanying illustration.

The present interpretation of *Dilobopterus burmeisteri* Signoret rests on the original description. This is the only species in which the female has an entirely yellow scutellum among those species considered by Signoret at the time of the original description. The only specimen in the Signoret collection in

NMV is labeled "Mexico", but all other specimens seen were from French Guiana. If the present writer has correctly associated a male from French Guiana, the male genitalia fall within the range of variation of *D. demissus* (Fabricius).

A female of *Tettigonia cynthia* Fowler, labeled "type" in RMS, was illustrated (fig. 99). It agreed with Fowler's original illustration fairly well. I have seen a male from "New Grenada", also from RMS, which appears to be this species. I have not been able to find "New Grenada" in gazeteers. The male genitalia, not illustrated here, are similar to those of *Dilobopterus politus* (Schmidt) (fig. 107).

No specimens of the type-species, *Dilobopterus decoratus* Signoret, have been seen, and the identity of the species is unknown, but there can be no doubt that the original description applies to a species of the genus as here interpreted.

The lectotypes of *Cicada demissa* Fabricius, from "South America" and of *Tettigonia cephalotes* Walker, from British Guiana, both without abdomens, had the head, pronotum and scutellum fairly similar to the illustration of *Dilobopterus selvanus*, n. sp., (below). None of the illustrations of the anterior dorsum published here were available for comparison at the time these lectotypes were examined. *D. demissus* is quite variable in these features, and *D. selvanus* is close; but since many of Fabricius' species originally described from "South America" have turned out to be from the Guianas, and since *D. selvanus* has not been found in the Guianas, the synonymy in the list below is proposed. *D. varius* Osborn, judging from the original illustration, must also be placed in synonymy.

The lectotype of *Cicada discoidea* Fabricius, without abdomen, was compared with representatives of all the species included here, and it appears distinct. It is marked similarly to some specimens of *Dilobopterus demissus* (Fabricius), but it is shorter and less robust, and the head is more strongly produced. The lectotype lacks the dark anterior pronotal markings of the illustrations of *demissus*.

The present interpretation of *Dilobopterus dispar* (Germar), of which the type has not been seen, rests on Signoret's (1853a: pl. 2, fig. 2) illustration. Two specimens from the museum in La Plata, syntypes of *Tettigonia windmülleri* Berg fall within the limits of the Germar species. The male is presently designated lectotype and has been so labeled. It bears labels: "Type" and "Banda/Oriental" and "*Dilobopterus*/(*Tettigonia*)/Windmülleri" and "567" and "Col. Berg" and "Museo La Plata".

The female lectotype of *Cicada exaltata* Fabricius agrees well with the accompanying illustration of the anterior dorsum of that species and females of the male illustrated here are as in the illustration of the lectotype. There is a marked variation in length of females of this species, from 7.5 mm to 8.2 mm.

A male syntype of *Tettigonia fastigiata* Uhler from the USNM is presently designated lectotype and has been so labeled. It bears labels: "Windward side/St. Vincent, W. I./H. H. Smith; 190." and a handwritten label: "Proconia/fastigiata/Uhler." and "PRUhler; Collection" and "Cotype No./U.S.N.M.".

The anterior dorsum of the lectotype of *Cicada fastuosa* Fabricius is like the accompanying illustration.

One of two female specimens from the Taschenberg collection from Martin Luther University, Halle an der Salle, East Germany, is presently designated lectotype of *Tettigonia frenata* Taschenberg and has been so labeled. There are no labels on the pin bearing the specimens, but pinned separately was the label: "frenata m/Venezuel.". The specimen agrees with the illustration published here.

The genitalia of a male specimen, compared with the female holotype of *Tettigonia gaudens* Walker, agrees with fig. 94.

The identity of *Tettigonia hexaptera* Burmeister is unknown to me, as it was to Signoret (1850b: 288).

A male, from Panama, compared with the female type of *Cicadella hyalinatula* Osborn, from Colombia, is the basis for my interpretation of that species.

The lectotype of *Tettigoniella jemima* Distant agrees with the illustrations published here.

Signoret (1850b: 287) described *Dilobopterus klugi* from a male. In the museum in Vienna, there are three specimens on a single pin, two of them females, the third without abdomen, bearing a "Cayenne" label and Signoret's determination label. These specimens belong to *D. dispar* (Germar) as interpreted here, and the determination label may be an error. The original description of *klugi* fits *dispar* well enough, but in the absence of a type specimen it seems advisable to retain it as an unknown species until it becomes clear that no other museum has the type.

The present interpretation of *Tettigonia laeta* Walker rests on the female holotype and a male compared with that specimen. The interpretation of *T. fervens* Walker is based on an examination of the female holotype and a comparison of this specimen with the holotype of *laeta*.

A male compared with the female lectotype of *Tettigonia lineosus* Fowler has genitalia much similar to the illustrations of *D. pardalinus* (Fowler) but with slight differences in paraphyses and with styles slightly longer. A male compared with the female lectotype of *T. pardalina* has genitalia like the illustrations published here except that the aedeagus is like the present illustration of the lectotype of *Tettigonia instrata* Fowler and like a male of a specimen compared with the lectotype (which is without an abdomen) of *Tettigonia quinquesignata* Walker. *Dilobopterus instratus, D. quinquesignatus* and *D. pardalinus* appear to be distinct externally. *Tettigonia multivirgata* Stål is placed in synonymy under *D. quinquesignata* (Walker) on the basis of the close similarity of drawings of the anterior dorsum and forewing of the lectotype of the Stål species (abdomen and legs missing; hindwings damaged) to the lectotype of the Walker species. This Central American complex of species is a difficult one, and long series of specimens are needed for study, but only short series are available.

Dilobopterus mosaicus (Fowler) is unknown, except from the illustration accompanying the original description. The writer found no specimens in the Naturhistorisches Museum in Vienna, and no specimens from Mexico have

been found corresponding with the illustration which is closer to the species described below as *D. fenestratus* than to any of the other species in the genus.

Tettigonia multicolor Walker is known only from the female lectotype. It may be synonymous with *D. demissus* (Fabricius), but the scope of the variations of the latter were not realized at the time the Walker type was studied, and restudy is needed.

I have studied the lectotype (NMV) and one additional female (OSU) of *Tettigonia segmentalis* Signoret. The female lectotype of *Tettigonia approximata* Stål agrees with figure 68.

The present interpretation of *Tettigoniella oliquatula* Jacobi is based on a comparison of the female lectotype with a number of females from Peru and Bolivia.

Dilobopterus stolli Signoret, as here interpreted, is based on the female lectotype and Signoret's (1853a, pl. 2, fig. 7) illustration of this distinctive species.

Dilobopterus syrphoidulus (Jacobi) is a species with a great deal of variability in color pattern. The accompanying illustrations of the male genitalia agree with the genitalia of the male lectotypes both of this nominal species and of *Tettigoniella lenea* Distant.

The present interpretation of *Dilobopterus trinotatus* (Signoret) rests on a comparison of the female lectotype with the male of which the genitalia are illustrated here. Two specimens from Martin Luther University belonging in different genera, were examined. Each was accompanied by a label: "Tettigonia flavofasciata Taschenberg". Only one of the specimens agreed with the original description. I placed a "holotype" label with that specimen. It is conspecific with *D. trinotatus* (Signoret).

The identity of *Dilobopterus vicinus* (Signoret) rests on a comparison of the female lectotype with the illustration of the anterior dorsum published here, and similarity between the illustrated male and Signoret's (1853, pl. 2, fig. 9) illustration.

SPECIES OF *DILOBOPTERUS*

(Species marked with single asterisk are known only from the female; those marked with a double asterisk are unknown to me).

adocetus, n. sp., NE. Brazil, Peru, Bolivia.

**aubei* (Signoret), 1855d:771 (*Tettigonia*). Colombia, New combination.

auctulus (Jacobi), 1905c:173 (*Tettigoniella*). Colombia, Peru, Bolivia. New combination.

spectabilis (Distant), 1908a:519 (*Tettigoniella*). New synonymy.

axillaris, n. sp. Fr. Guiana.

bimaculatus Signoret, 1850b:286. Fr. and Br. Guiana.

bracteatulus (Jacobi), 1905c:174 (*Tettigoniella*). Brazil, Peru. New combination.

chiriquensis (Fowler), 1899c:237 (*Tettigonia*). Panama. New combination.

clypeatus, n. sp. Bolivia.

corixoides (Fowler), 1899c:240 (*Tettigonia*). Panama. New combination.

costalimai, n. sp. Central and SE. Brazil, Paraguay, Argentina.

croceus (Metcalf) (new name), 1955a:264 (*Amblyscarta*). Colombia. New combination.

aestuans (Walker), 1851b:750 (*Tettigonia*) (preoccupied).

cynthia (Fowler), 1899c:236 (*Tettigonia*). Panama. New combination.

decoratus Signoret, 1850b:285.

demissus (Fabricius), 1803a:73 (*Cicada*). Panama, Colombia, Br. and Fr. Guiana, Ecuador, Peru, Bolivia, NE., NW. and central Brazil.

burmeisteri Signoret, 1850b:286. New synonymy.

cephalotes (Walker), 1851b:759 (*Tettigonia*).

varius Osborn, 1926b:172. New synonymy.

**discoideus* (Fabricius), 1803a:73 (*Cicada*). South America.

dispar (Germar), 1821a:71 (*Tettigonia*). Bolivia, E. and SE. Brazil, Uruguay, Argentina.

windmuelleri (Berg), 1884a:20. (*Tettigonia*). New synonymy.

disparulus, n. sp. Brazil.

errabundus, n. sp. Colombia.

exaltatus (Fabricius), 1803a:71 (*Cicada*). Br. and Fr. Guiana, N. and central Brazil, Peru, Bolivia.

fastuosus (Fabricius), 1803a:70 (*Cicada*). Br. and Fr. Guiana, NE. Brazil. New combination.

terminalis (Osborn), 1926b:183 (*Cicadella*). New synonymy.

fenestratus, n. sp. Brazil, Ecuador, Peru, Bolivia.

**frenatus* (Taschenberg), 1884a:448 (*Tettigonia*). Colombia, Venezuela. New combination.

subhyalina (Osborn), 1926b:184 (*Cicadella*). New synonymy.

gaudens (Walker), 1851b:743 (*Tettigonia*). Peru, N. Brazil. New combination.

guadulpensis (Lethierry), 1881b:17 (*Tettigonia*). St. Vincent Is., Guadeloupe Is., Chile. New combination.

fastigiatus (Uhler), 1895a:75 (*Tettigonia*). New synonymy.

***hexapterus* (Burmeister), 1835a:118 (*Tettigonia*).

hyalinatulus (Osborn), 1926b:182 (*Cicadella*). Panama, Colombia. New combination.

instratus (Fowler), 1899c:237 (*Tettigonia*). Guatemala, Panama.

larvata (Fowler), 1899c:238 (*Tettigonia*). New synonymy.

jemima (Distant), 1908a:519 (*Tettigoniella*). Ecuador, Peru, Bolivia, W. Brazil. New combination.

***klugi* Signoret, 1850b:287. Fr. Guiana.

knighti, n. sp. Colombia.

laetus (Walker), 1851b:748 (*Tettigonia*). N. Brazil.

fervens (Walker), 1851b:809 (*Tettigonia*).

lineosus (Fowler), 1899c:240 (*Tettigonia*). Costa Rica, Panama. New combination.

lobatus, n. sp. Tobago Is.

lucentis, n. sp. Br. and Fr. Guiana.

manni, n. sp. Peru, Bolivia.

minutalis, n. sp. Mexico.

***mosaicus* (Fowler), 1899c:239 (*Tettigonia*). New combination.

**multicolor* (Walker), 1851b:760 (*Tettigonia*). N. Brazil.

myersi, n. sp. Trinidad.

nigrovenosus, n. sp. Colombia.

oliquatulus (Jacobi), 1905c:173 (*Tettigoniella*). Colombia, Ecuador, Peru, Bolivia, central Brazil. New combination.

pardalinus (Fowler), 1899c:238 (*Tettigonia*). Costa Rica, Panama. New combination.

politus (Schmidt), 1928c:82 (*Marizella*). Venezuela, Ecuador, Peru. New combination.

ponerus, n. sp. Peru, Bolivia, central Brazil.

quinquesignatus (Walker), 1858b:194 (*Tettigonia*). Mexico, Panama. New combination.

multivirgata (Stål), 1864a:73 (*Tettigonia*).

segmentalis (Signoret), 1853b:345 (*Tettigonia*). S. Brazil. New combination.

approximata (Stål), 1862e:39 (*Tettigonia*). New synonymy.

selvanus, n. sp. Central Brazil.

stolli Signoret, 1850b:287. Mexico, Guatemala, Panama, Colombia, Venezuela, Br. Guiana.

syrphoidulus (Jacobi), 1905c:170 (*Tettigoniella*). Ecuador, Peru, Bolivia, central Brazil.

lenea (Distant), 1908a:520 (*Tettigoniella*). New synonymy.

trinotatus (Signoret), 1853a:39 (*Tettigonia*) New name for *trifasciatus* Signoret which was a secondary homonym. SE. Brazil.

trifasciatus Signoret, 1850b:288.

flavofasciata (Taschenberg), 1884a:450 (*Tettigonia*). Preoccupied. New synonymy.

nigrofuscata Metcalf, 1965a:187. New name for *Tettigonia flavofasciata* Taschenberg, 1884a:450. New synonymy.

vicinus (Signoret), 1853a:35 (*Tettigonia*). Colombia, Bolivia, Brazil, Paraguay.

KEY TO MALES OF *DILOBOPTERUS*

(Not included: *D. aubei* (Signoret) (fig. 110); *D. croceus* (Metcalf) (fig. 111); *D. frenatus* (Taschenberg) (fig. 112); *D. decoratus* Signoret; *D. discoideus* (Fabricius); *D. hexapterus* (Burmeister); *D. klugi* Signoret; *D. mosaicus* (Fowler); *D. multicolor* (Walker) (fig. 67); *D. segmentalis* (Signoret) (fig. 68)).

1. Pygofer with an anteapical process arising on posteroventral margin or a reduced subapical process 2
   Pygofer without such a process 3

2. Aedeagus with asymmetrical processes arising near base; pronotum with a transverse black marking at base and apex
   auctulus (Jacobi) (fig. 69)
   Aedeagus without processes, pronotal dark markings not so, but arranged to delimit several pale areoles ..... *fenestratus*, n. sp., page 115

3. Paraphyses present 4
   Paraphyses absent 40

FIGURES 67, 68.—67, *Dilobopterus multicolor* (Walker), lectotype (round area on scutellum is pin). 68, *D. segmentalis* (Signoret), lectotype.

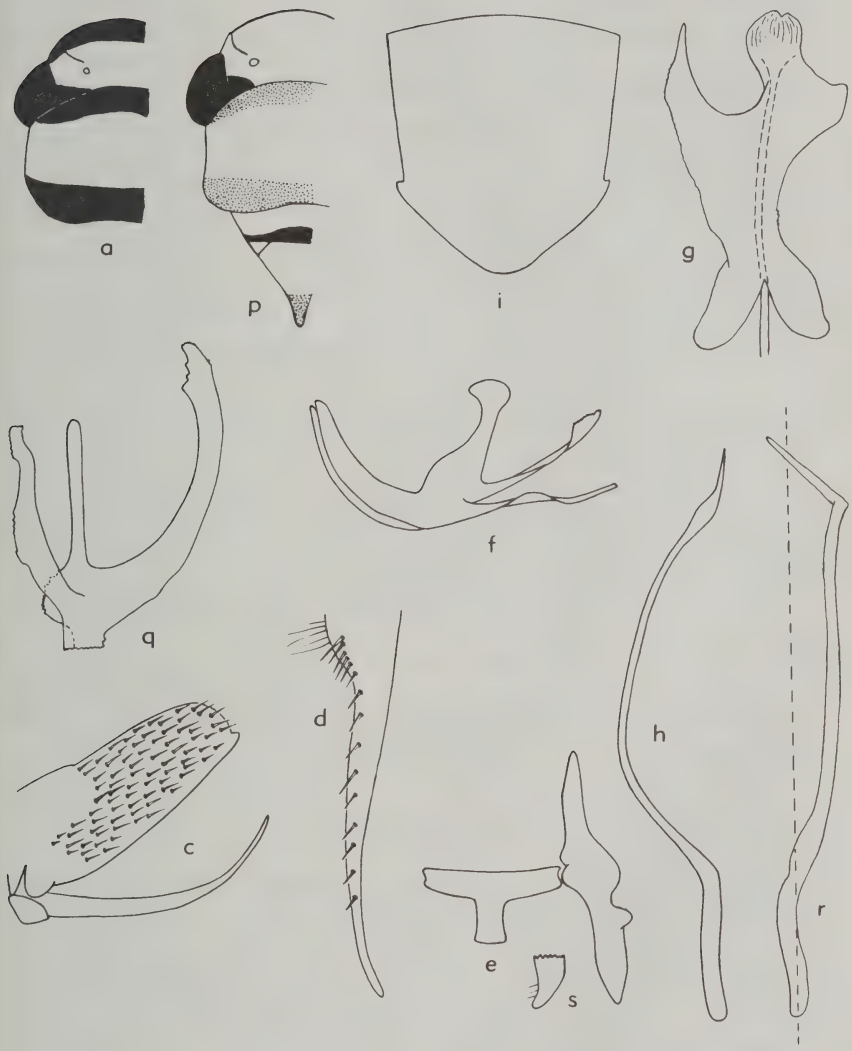


FIGURE 69.—*Dilobopterus auctulus* (Jacobi) (*a, c, d, f,* from lectotype; *i, p,* from lectotype of *Tettigoniella spectabilis* Distant; remainder from specimens from Tingo María, Peru; *h* from dorsal view): *p,* Anterior dorsum; *q,* aedeagus from caudoventral view, base not shown; *r,* paraphysis from ventral view; *s,* style apex from lateral view.

4. Paraphyses bifurcate, the rami with numerous elongate tenent hairs or microsetae, aedeagus with scalelike sculpturing
trinotatus (Signoret) (fig. 71)
Genitalia not as above 5

5. Aedeagus elongate, slender, either with a pair of apical processes or with a dorsal process separated from shaft almost throughout its length ... 6
Aedeagal shaft much shorter, otherwise not as above 7

6. Aedeagal shaft digitate, with a dorsal process separated from shaft by excision as long as shaft ..... *lobatus,* n. sp., page 134
Aedeagal shaft not digitate, bifurcate apically, with one of the rami extending basally along shaft ..... *myersi,* n. sp., page 144

7. Pronotum with two regular uninterrupted white to orange transverse stripes which are completely separated from each other except rarely in middle of disk 8
Pronotum not as above, if two transverse stripes present, then confluent laterally or interrupted medially 14

8. Hindwing with conspicuously enlarged jugal lobe (fig. 113) 9
Hindwing without enlarged jugal lobe (fig. 114) 10

9. Crown of head yellow with black markings .... *vicinus* (Signoret) (fig. 74)
Crown of head black with yellow markings ..... *laetus* (Walker) (fig. 75)

10. Aedeagus in lateral view with width equal to, or greater than length .. 11
Aedeagus in lateral view with length much greater than width
clypeatus, n. sp., page 121

11. Forewing with narrow transverse pale markings
quinquesignatus (Walker) (fig. 77)
Forewing with markings not arranged in transverse bands 12

12. Pale markings of discal portion of forewing consisting of separate spots
pardalinus (Fowler) (fig. 78)
Pale markings of discal portion of forewing parallel to longitudinal veins 13

13. Crown with width of transverse black band behind apex much less than basal black band of crown ..... *lineosus* (Fowler)
Crown with width of transverse black band behind apex greater than basal black band of crown ..... *instratus* (Fowler) (fig. 79)

14. Aedeagus in lateral view with two distinct lobes separated by a deep concavity or with a conspicuous lobe above apex of shaft (figs. 80*f*, 82*f*) 15
Aedeagus in lateral view not as above 22

15. Aedeagus in lateral view with a conspicuous lobe, directed posteriorly, above apex of shaft and not separated from latter by a deep concavity (fig. 80*f*); pronotum with sinuous transverse black markings
costalimai, n. sp., page 136
Without the above combination of characters 16

16. Color of crown and pronotum pale, dark markings in form of few small black spots ..... *bimaculatus* Signoret (fig. 81)
Crown and pronotum with black markings much more extensive 17

17. Paraphyses in lateral view consisting only of two elongate asymmetrical rami separating near base; crown of head with an anchor-shaped marking at apex 18
Paraphyses in lateral view much more complex; crown of head with apical markings otherwise 19

18. Paraphyses with one of the rami much more slender than other; crown with basal half pale ..... *selvanus*, n. sp., page 141
Paraphyses with both rami of nearly equal width; crown with a pair of reversed parentheses-shaped markings on basal half (fig. 83) *manni*, n. sp., page 139

19. Crown of head pale with a narrow transverse black marking at middle of disk and one at apex ..... *stolli* Signoret (fig. 84)
Crown of head with dark markings much more extensive 20

20. Forewing with an orange anteapical spot ..... *dispar* (Germar) (fig. 85)
Forewing without such a spot 21

21. Forewing with commissural margin black; length less than 8 mm *disparulus*, n. sp., page 131
Forewing with commissural margin unmarked; length greater than 8 mm *ponerus*, n. sp., page 129

22. Aedeagus with a unilateral process arising at or beyond midlength *exaltatus* (Fabricius) (fig. 88)
Aedeagus without a process 23

23. Hindwing with jugal lobe greatly enlarged (fig. 113) 24
Hindwing with jugal lobe not greatly enlarged (fig. 114) 26

24. Crown, pronotum, and scutellum tan, with very few dark markings *lucentis*, n. sp., page 144
Anterior dorsum not so marked 25

25. Length seldom exceeding 9 mm; crown with color pattern variable but always heavily marked with black; aedeagus broadest anteapically *demissus* (Fabricius) (figs. 91, 92)
Length more than 11.5 mm; crown not so marked; aedeagus almost of uniform width throughout length ..... *axillaris*, n. sp., page 128

26. Total length to apices of forewing at rest 8.5 mm or less *guadulpensis* (Lethierry) (fig. 93)
Total length to apices of forewing at rest more than 8.5 mm 27

27. Forewing coriaceous from base to middle of anteapical cells *gaudens* (Walker) (fig. 94)
Forewing not so 28

28. Crown of head with black markings consisting of only four small spots *hyalinatulus* (Osborn) (fig. 95)
Crown of head with black markings more extensive 29

29. Forewing without a transverse orange or yellow corial marking beyond apex of clavus, and without several orange areoles in a transverse group 30
Forewing with a transverse orange or yellow corial marking beyond apex of clavus, or with several orange areoles in a transverse group 35

30. Forewing without longitudinal black vittae 31
Forewing with longitudinal black vittae 32

31. Forewing with apical cells fumose, head with anterior margin broadly rounded in dorsal view ..... *obliquatulus* (Jacobi) (fig. 96)
Forewing with apical cells hyaline, head with anterior margin subangulate in dorsal view ..... *syrphoidulus* (Jacobi) (fig. 97)

32. Posterior pronotal margin brown- or black-bordered 33
Posterior pronotal margin yellow-bordered 34

33. Crown and pronotum each with a transverse, broad, pale stripe *knighti*, n. sp., page 117
Crown and pronotum without transverse pale markings *cynthia* (Fowler) (fig. 99)

34. Paraphyses with one of the rami branched; clypellus completely black *errabundus*, n. sp., page 123
Paraphyses with both rami unbranched; clypellus pale at base *nigrovenosus*, n. sp., page 119

35. Style extending posteriorly not as far as, or only slightly farther than apex of connective (fig. 102*e*) or with lobe occurring opposite base of connective (fig. 103*e*) 36
Style extending posteriorly distinctly farther than apex of connective (figs. 108*e* and 109*e*) and/or with lobe anteapical 37

36. Forewing with paired orange areoles opposite scutellum separated from each other only by width of claval suture, the areoles angular; paraphyses not branched; discal transverse dark band of pronotum usually entire ..... *bracteatulus* (Jacobi) (fig. 102)
Forewing with paired orange areoles opposite scutellum more widely separated, rounded; paraphysis branched apically; discal transverse dark band of pronotum interrupted ..... *jemima* (Distant) (fig. 103)

37. Paraphysis curved dorsally, thence apically, unbranched or with a small anteapical branch ..... *fastuosus* (Fabricius) (fig. 104)
Paraphysis or paraphyses not as above 38

38. Forewing, pronotum and scutellum with at least some maroon markings *chiriquensis* (Fowler) (fig. 105)
Without maroon markings 39

39. Aedeagus in caudoventral view with a pair of short lateral angular apical protuberances ..... *adocetus,* n. sp., page 126
Aedeagus not as above ..... *politus* (Schmidt) (fig. 107)

40. Crown black with a narrow pale line parallel to anterior margin *corixoides* (Fowler) (fig. 108)
Crown black with pale spots, without such a line *minutalis,* n. sp., page 147

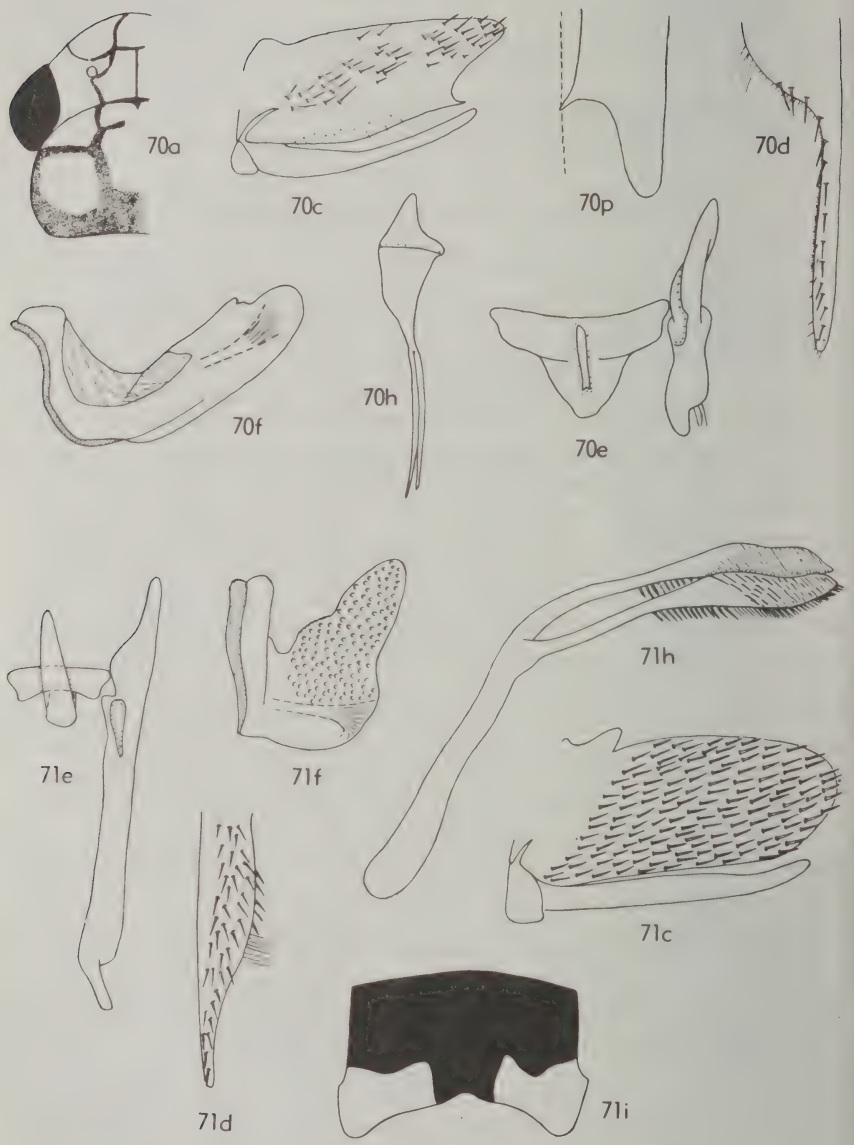
Dilobopterus fenestratus, NEW SPECIES

FIGURE 70, PAGE 116

Length of male 10.1-12.0 mm. Head with median length varying from one-half to more than six-tenths interocular width and from one-third to less than four-tenths transocular width, anterior margin broadly rounded in dorsal view; ocelli located behind a line between anterior eye angles and each slightly closer to adjacent eye angle than to median line of crown, with a slight transverse concavity before ocelli; lateral clypeal sutures not attaining ocelli; antennal ledges with anterior margins obliquely convex, with or without a slightly concave dorsal area. Pronotum not transversely rugose; forewing with a membranous area of variable extent near midlength, the veins distinct here, obscure elsewhere except apically; hindwing with jugal lobe not enlarged.

Pygofer strongly produced, with macrosetae irregularly dispersed on disk and submarginally to dorsoapical lobe; posteroventral margin with an undifferentially sclerotized angular process; plates extending posteriorly almost to pygofer apex, each triangular, abruptly narrowed in basal half, with a longitudinal row of macrosetae on apical four-fifths; style extending posteriorly only slightly farther than apex of connective, with a distinct preapical lobe; connective broadly T-shaped, with a median keel; aedeagus symmetrical, without processes; paraphyses almost symmetrical.

Crown and pronotum stramineous with narrow dark inscriptions delimiting three pale areoles on anterior margin and two bordering posterior margin between ocelli on crown and three short anterior, three longer posterior areoles on pronotum, some of the areoles occasionally confluent; lateral and posterior pronotal margins dark; scutellum with dark markings delimiting three basal pale areas, apical half pale. Forewing brown with a round areole in base of clavus, two small areoles near midlength of clavus bordering commissural margin, an elongate areole bordering claval suture; a round areole in base of corium, portion of brachial cell and cells R and M and occasionally smaller adjoining areoles behind costal margin, and three small areoles in anteapical cells, hyaline to yellowish hyaline. Face pale yellow to orange with median line of clypeus and occasionally a pair of lateral lines intersecting muscle impressions, median line and apex of clypellus, transclypeal suture, lateral clypellar and clypeal sutures and dorsal portion of loral suture, black. Thoracic pleura yellow; thoracic sterna yellow except black portion of prosternum.



FIGURES 70, 71.—70, *Dilobopterus fenestratus*, n. sp. (from specimen from Itaituba, Brazil; *h* from dorsal view): *p*, Pygofer apex, left side, from ventral view. 71, *D. trinotatus* (Signoret) (*i* from specimen from "Brazil"; remainder from Santos, Brazil; *h* from lateral view).

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Holotype male, Itaituba, Brazil (USNM). A number of additional males. Monsón Valley, Tingo María, Peru, October 29, 1954 (CAS). One male, Tingo María, Peru, October, 1946 (AMNH). Four males, "Peru"; Callanga, Peru; and San Antonio, Bolivia (RMS). One male, Covendo, Bolivia (USNM). Two males, Cuenca, Ecuador (BM). Two males, Yungas de Palmar, Bolivia, Nov. 19, 1960 (SSM). Three males, "Peru" and Loja, Ecuador (MHNP). Three males, Baños, Ecuador; Marcapata, Peru; and Mapiri, Bolivia (NCS).

D. fenestratus, n. sp., differs from all other species with ventral pygofer processes in its color markings. Externally it is very similar to the species Fowler illustrated as *Tettigonia mosaica* Fowler (1899c: pl. 15, fig. 12) and of which he stated that the type was in the Vienna Museum, in the Signoret collection. The type locality of the Fowler species is "Mexico". No specimens were found in the Signoret collection in Vienna. Metcalf identified (unpublished) specimens from Marcapata, Peru and Mapiri, Bolivia with *mosaica* (Fowler). If the specimens Fowler saw from the Vienna Museum were mislabeled, the present writer would agree with this.

Dilobopterus knighti, NEW SPECIES

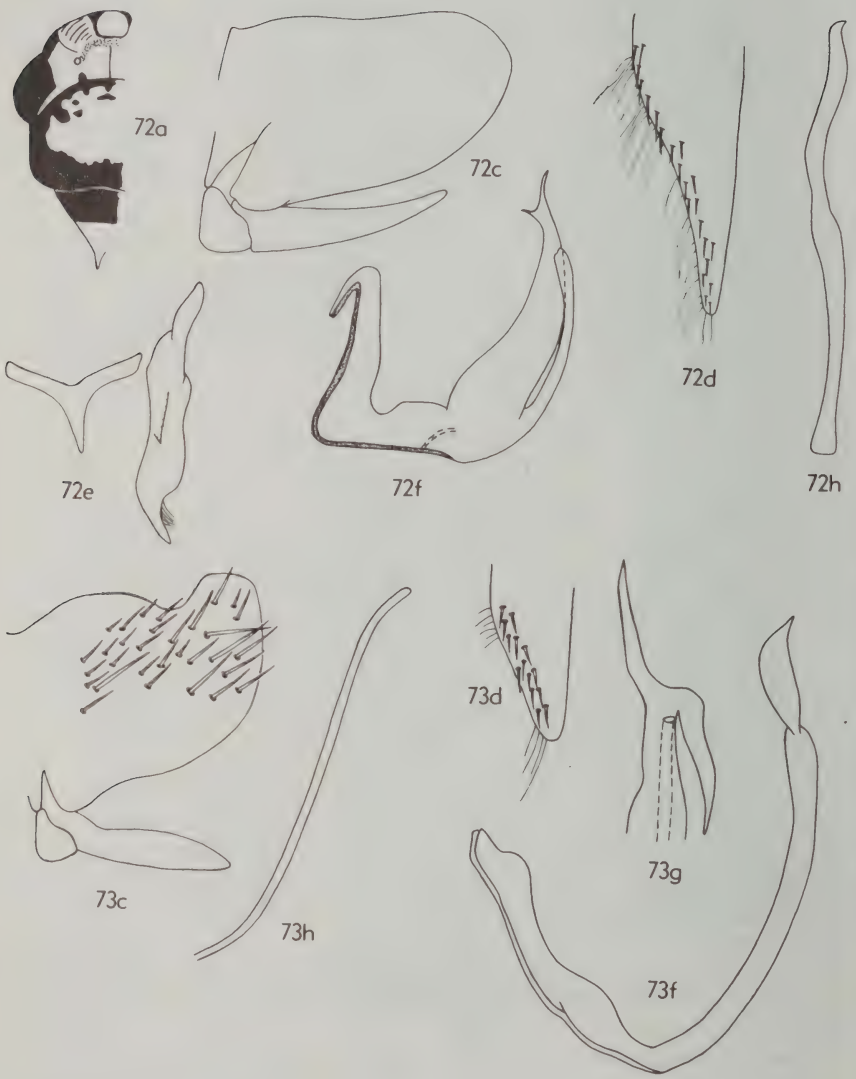
FIGURE 98, PAGE 138

Length of male 10.8 mm, of female 12.0 mm. Head with median length varying from four-tenths to slightly more than one-half interocular width and approximately one-fourth transocular width, anterior margin broadly rounded in dorsal aspect, ocelli located behind a line between anterior eye angles and each approximately equidistant from median line of crown and adjacent anterior eye angle, with a slight transverse concavity before ocelli; other head characters as in *D. fenestratus,* n. sp. Pronotum not transversely rugose; forewing with veins indistinct, except apically; hindwing with jugal lobe not enlarged.

Pygofer with macrosetae closely spaced, occurring over all of surface except basal portion, without processes; plates not extending as far posteriorly as pygofer apex, each triangular, with lateral margins regularly convex in basal third, mesal margins fused basally, with a single row of macrosetae on apical four-fifths; style extending posteriorly much farther than apex of connective, with a preapical lobe; connective subtriangular with a Y-shaped keel; aedeagus symmetrical, without processes; paraphyses paired, asymmetrical.

Female abdominal sternum VII much as in the present illustration of *D. croceus* (Metcalf) (fig. 111*i*).

Crown, pronotum, and scutellum each black-margined before and behind, the crown with posterior black margin narrow; each with a broad transverse pale yellow to orange band; forewings smoky, with scutellar transverse band continued across their bases almost to each costal margin, on each wing connected with a narrow longitudinal claval strip within claval suture almost to claval apex and also with a broader, longer corial stripe extending to bases of third and fourth apical cells. Face pale with clypellus and apical half of clypeus, black.



FIGURES 72, 73.—72, *Dilobopterus lobatus*, n. sp., holotype (setae not shown in *c; h* from dorsal view). 73, *D. myersi*, n. sp., holotype (only apex of aedeagus shown in *g; h* from lateral view).

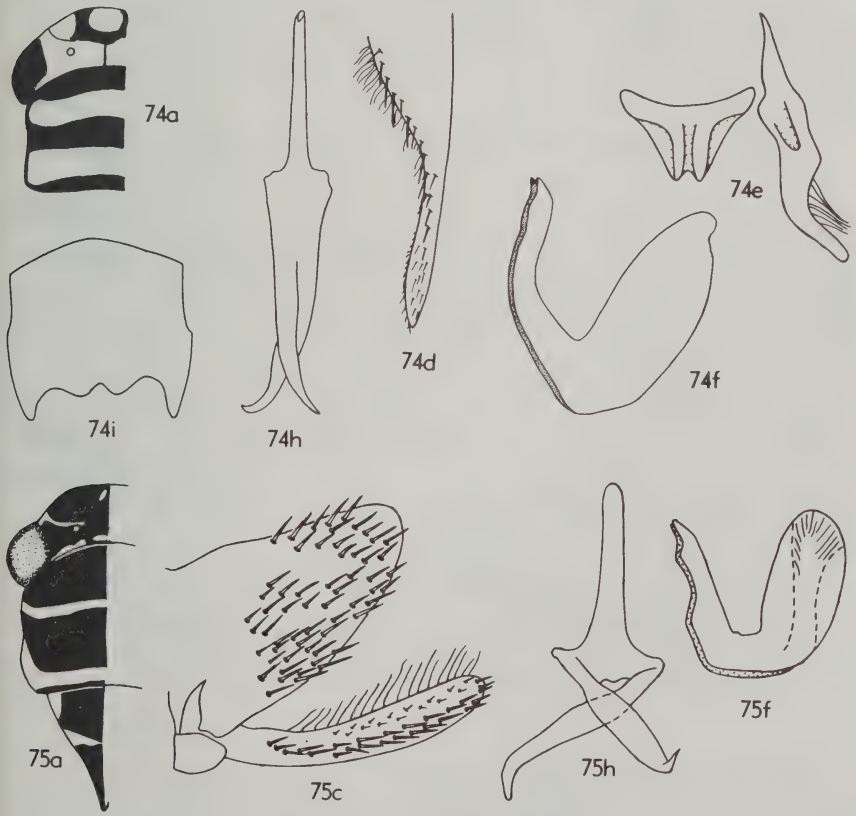
Holotype male, Colombia (L. Richter), 1941. A pair of specimens, Bogotá, Colombia, and an additional male from Colombia (RMS). Holotype on indefinite loan to USNM from NCS.

D. knighti, n. sp., is named in honor of W. J. Knight, of the British Museum, who has been most helpful in making comparisons with types in this genus. The species is closely related to *D. nigrovenosus,* n. sp., from which it may be separated by the shape of the aedeagus in lateral view (compare figs. 98*f* and 101*f*).

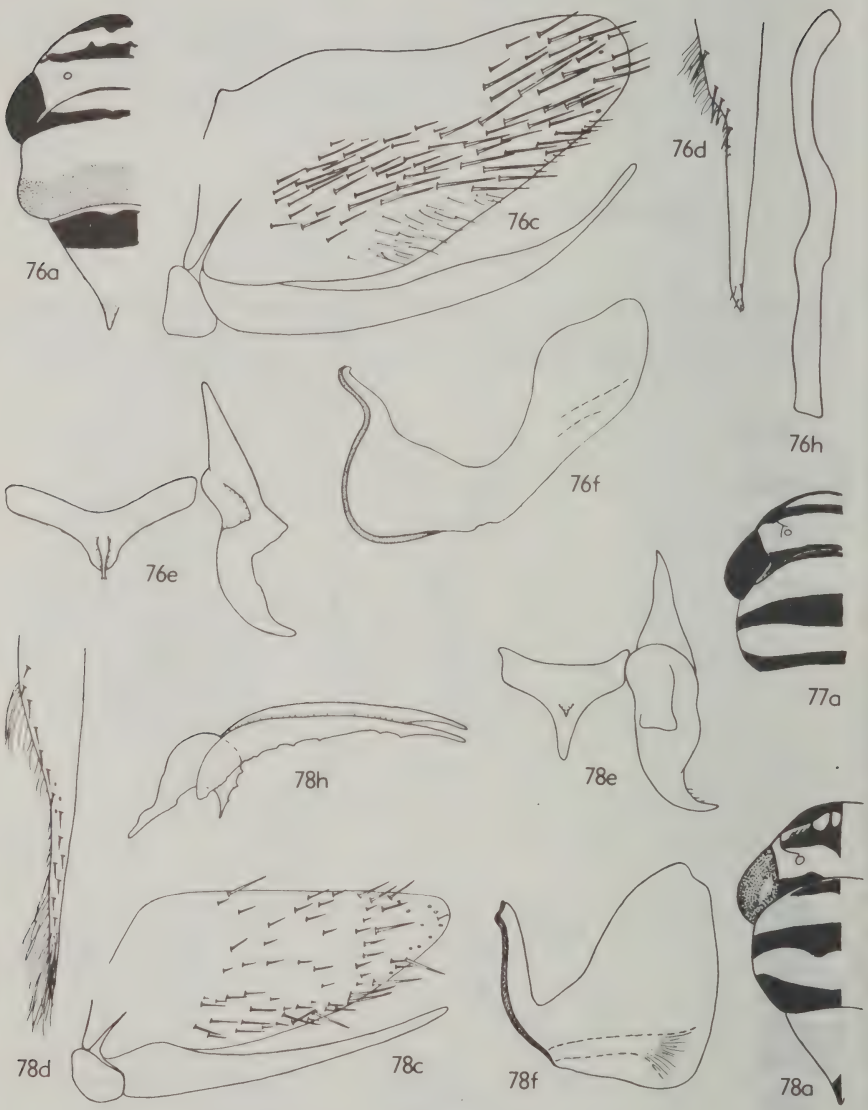
Dilobopterus nigrovenosus, NEW SPECIES

FIGURE 101, PAGE 138

Length of male 8.1 mm, of female 8.1-8.5 mm. Head with median length slightly more than four-tenths interocular width and slightly less than one-third transocular width, ocelli located behind a line between anterior eye



FIGURES 74, 75.—74, *Dilobopterus vicinus* (Signoret) (*i* from specimen from Brazil; remainder from Bolivia). 75, *D. laetus* (Walker), holotype.



FIGURES 76-78.—76, *Dilobopterus clypeatus*, n. sp., holotype (*h* from dorsal view). 77, *D. quinquesignata* (Walker) (from the lectotype of *Tettigonia multivirgata* Stål). 78, *D. pardalinus* (Fowler) (from specimen from Costa Rica); *h* from lateral view.

angles, each slightly closer to adjacent anterior eye angle than to median line, without a transverse concavity before ocelli; other head characters as in *D. fenestratus,* n. sp. Pronotum not transversely rugose; forewing with veins distinct; hindwing with jugal lobe not enlarged.

Male genitalia as in *D. knighti,* n. sp. except aedeagus which is much shorter and broader, and male plates each of which is less convex on lateral margin near base (fig. 101*d*).

Female abdominal sternum VII broadly and shallowly concave.

Crown, pronotum, and scutellum, dull yellow, a spot at apex of crown, narrow anterior margin of pronotum, a transverse band before posterior pronotal margin, basal half and extreme tip of scutellum, black. Forewing hyaline, a stripe bordering humeral and commissural margins of clavus, brachial cell, basal two-thirds of outer anteapical cell, veins before apical cells and a broad marginal apical area, smoky. Face and venter pale brown except apical two-thirds of clypellus which is black.

Holotype male and three females. Bogotá, Colombia (Lindig.) (RMS).

D. nigrovenosus, n. sp. is closely related to *D. knighti,* n. sp., from which it may be separated most readily by the shape of the aedeagus (figs. 98*f* and 101*f*). It is also closely related to *D. errabundus,* n. sp., from which it may be distinguished by the characters in the key.

Dilobopterus clypeatus, NEW SPECIES

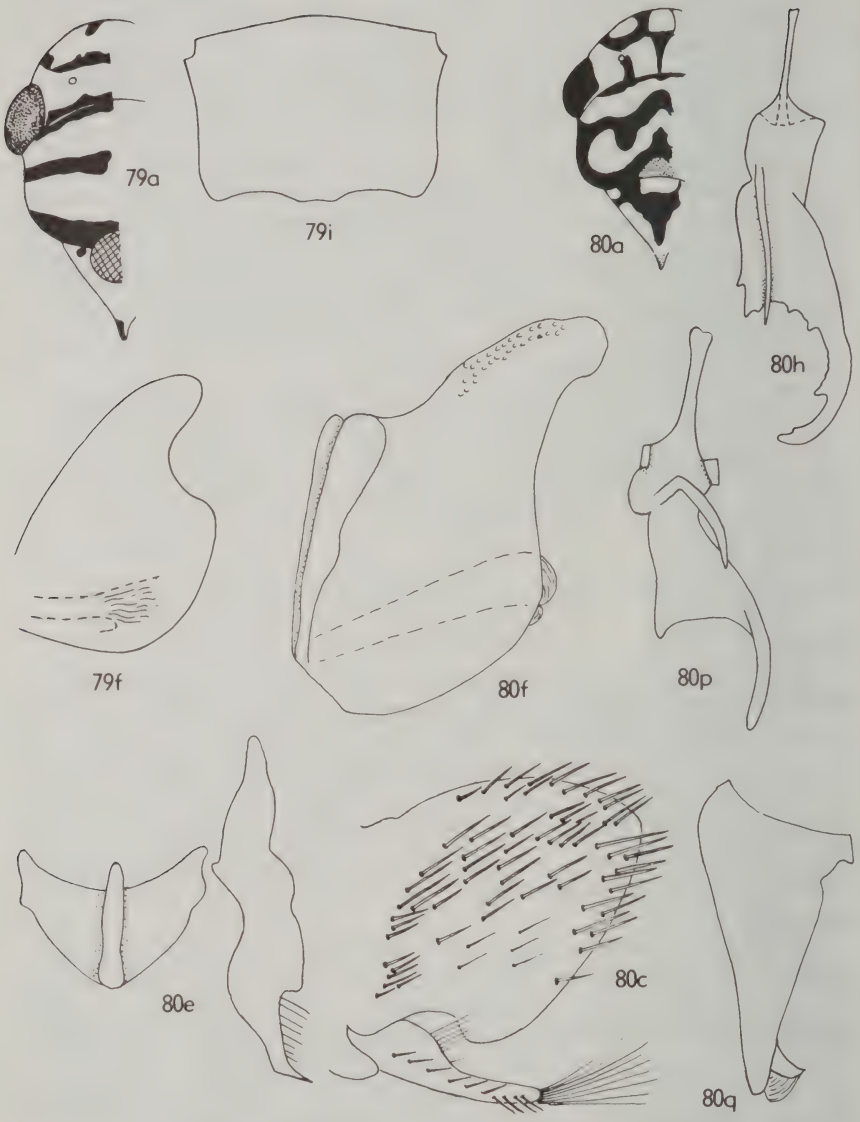
FIGURE 76, PAGE 120

Length of male 9.0-9.1 mm. Head with median length varying from slightly less than one-half to slightly more than one-half interocular width and from slightly less than one-third to almost four-tenths transocular width; ocelli located behind a line between anterior eye angles and each closer to adjacent anterior eye angle than to median line of crown, without a transverse concavity before ocelli; antennal ledges with a very slightly concave dorsal area, other head characters as in *D. fenestratus,* n. sp. Pronotum without sculpturing; forewing with membrane including apical cells; hindwing with jugal lobe not enlarged.

Pygofer with numerous macrosetae on disk from near base to posterior margin and with a number of microsetae along posteroventral margin, without processes; plates extending posteriorly as far as pygofer apex, each triangular, abruptly narrowed in basal half and with few macrosetae on basal half; style extending posteriorly considerably beyond apex of connective, without distinct preapical lobe; connective very broad, keeled medially; aedeagus symmetrical, without processes; paraphysis unpaired, asymmetrical, blunt at apex.

Female unknown.

Anterior dorsum pale yellow to old golden, with black transverse stripes at apex and middle of crown, anterior part of pronotum and base of scutellum; posterior margin of pronotum broadly bordered with chocolate brown, scutellar apex brown. Forewings with a transverse basal transcommissural dark vitta across apex of scutellum and on each wing attaining brachial cell



FIGURES 79, 80.—79, *Dilobopterus instratus* (Fowler) (*a, i,* from the lectotype of *Tettigonia larvata* Fowler; *f* from the lectotype of *instratus,* base of aedeagus not shown). 80, *D. costalimai,* n. sp. (*a, e,* from holotype; remainder from specimen from Bellavista, Argentina; *h* from dorsal view): *p,* Paraphyses from dorsal view; *q,* pygofer, left side, from dorsal view.

where it forms an angle and extends posteriorly almost to apex of brachial cell; costal margin broadly bordered with a black stripe which angles abruptly mesad at its apex at inner apical cell, the transverse portion bordered posteriorly by a transverse yellow area, with a black stripe on each wing extending from transcommissural stripe at half its length posteromesally to black commissural margin at midlength of clavus, enclosing yellow area along commissure near apex of scutellum; apical cells smoky subhyaline. Face white with clypeus and clypellus entirely, and lora partly, jet black.

Holotype male, Rurrenabaque, Beni, Bolivia (W. M. Mann), Nov., bearing also the label "Mulford; Bio. Exp.; 1921-22" and one male topotype (USNM).

The male genitalia of *D. clypeatus*, n. sp., resemble somewhat those of *D. knighti*, n. sp., differing in the shorter styles, broader connective and unpaired paraphyses in *clypeatus*.

Dilobopterus errabundus, NEW SPECIES

FIGURE 100, PAGE 138

Length of male and female 11.0 mm. Head with median length varying from four-tenths to slightly less than one-half interocular width and from one-fourth to slightly less than one-third transocular width; without a transverse concavity before ocelli; antennal ledges with anterior margins obliquely convex; other head characters as in *D. fenestratus*, n. sp. Pronotum not transversely rugulose; forewing with membrane including apical cells and apical portion of anteapical cells, veins distinct; hindwing with jugal lobe not enlarged.

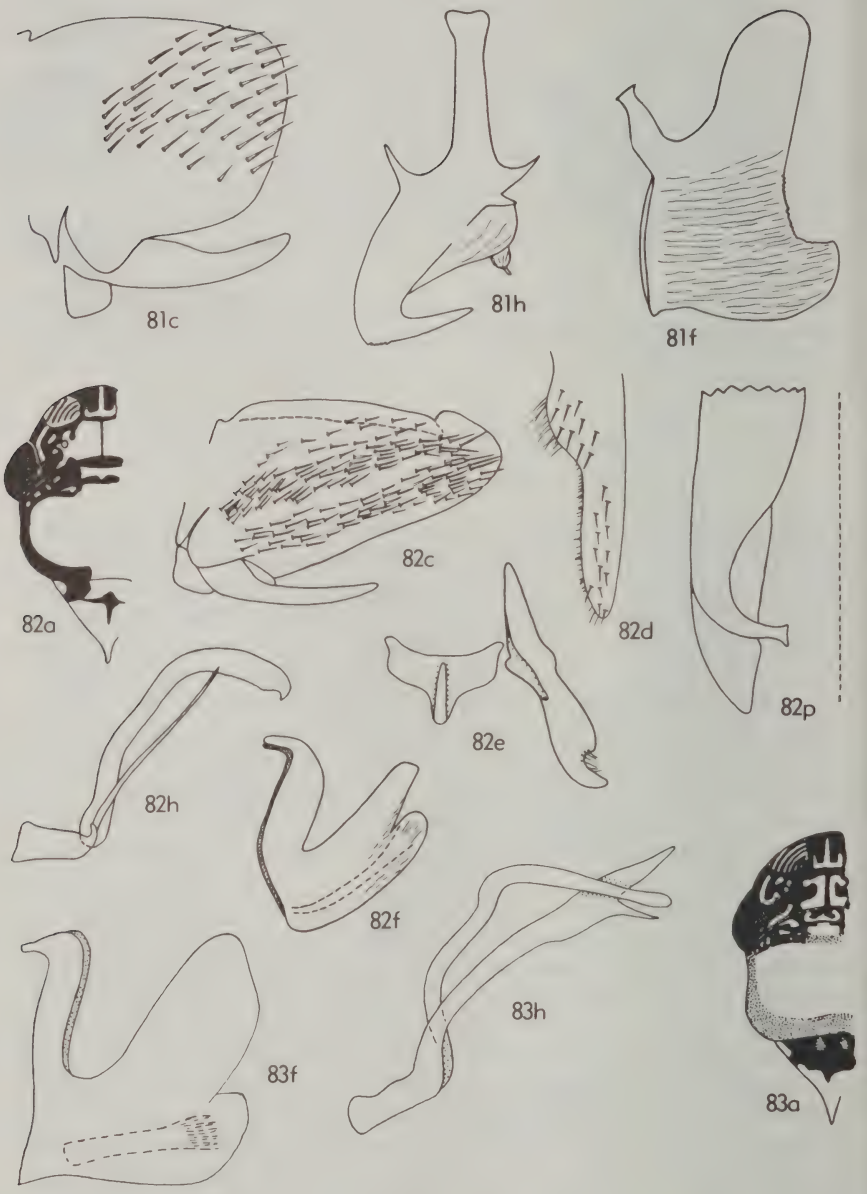
Male plates not fused basally, macrosetae biseriate on broadest portion of plate; paraphyses asymmetrical, paired, with one of the branches forked, other genital characters as in *D. knighti*, n. sp., except aedeagus which is like the present illustration of *D. nigrovenosus*, n. sp. (fig. 101*f*).

Female abdominal sternum as in the present illustration of *D. croceus* (Metcalf) (fig. 111*i*).

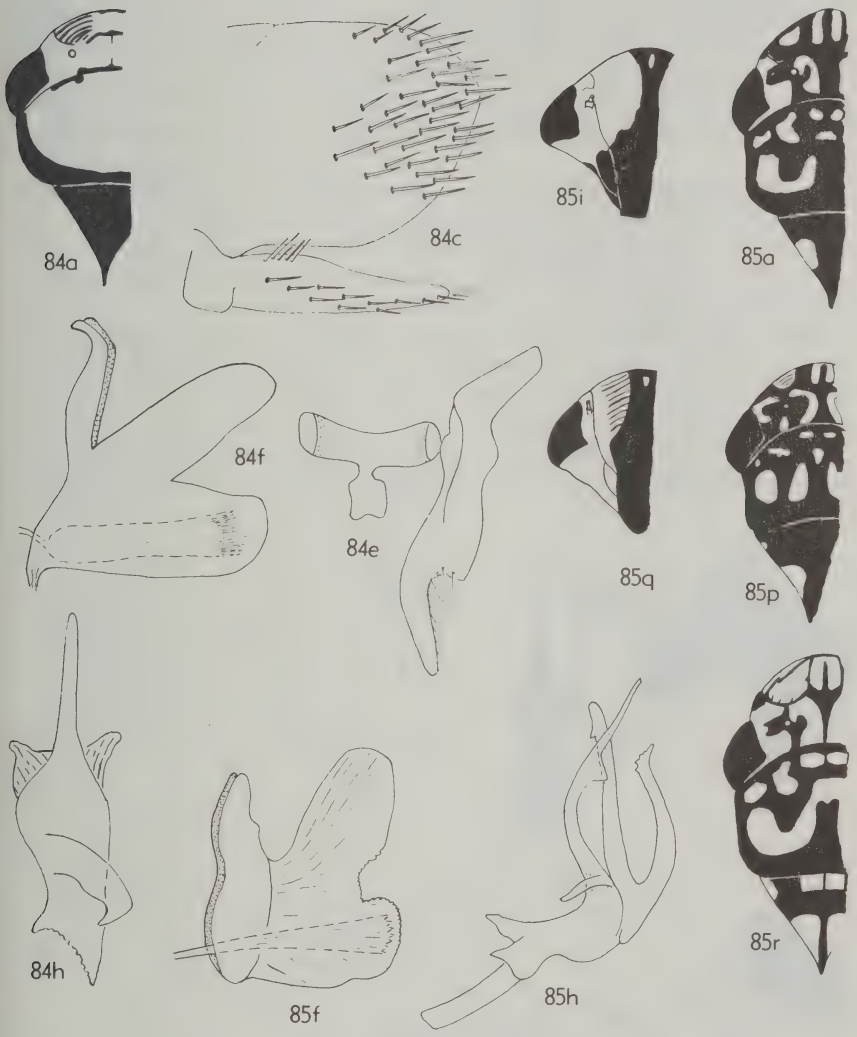
Color of anterior dorsum as in *knighti*, except that posterior margin of crown is bordered with black and that pronotal black stripe is narrower, not extending posteriorly to posterior margin of pronotum. Forewing hyaline to translucent orange marked with black; clavus with complete (type) black border or with diagonal anterior border interrupted in some specimens; corium with longitudinal veins, brachial cell, costal cell in basal half and continuing onto outer anteapical cell, and apical cell, black, with a transverse anteapical subhyaline area across apical cells. Face pale yellow; clypellus entirely black.

Holotype male, Bogotá, Colombia, three additional male and two female topotypes (three of the specimens collected by Lindig) (RMS). One male, Colombia (OSU). One male, Muzo, Dept. Boyaca, Colombia (MCZ).

D. errabundus, n. sp., is very closely related to *D. nigrovenosus*, n. sp., but differs in the coloration of the anterior dorsum, the forewings, in the greater extent of clypellar dark markings, and in its paraphyses which are described above.



FIGURES 81-83.—81, *Dilobopterus bimaculatus* Signoret, lectotype (*h* from dorsal view). 82, *D. selvanus*, n. sp., holotype (*h* from lateral view): *p*, Pygofer apex, left side, from dorsal view. 83, *D. manni*, n. sp., holotype (*h* from lateral view).



FIGURES 84, 85.—84, *Dilobopterus stolli* Signoret (*a* from specimen from Monteria, Colombia; remainder from Panama Province, Panama; *h* from dorsal view). 85, *D. dispar* (Germar) (*p, q, r,* from specimens from Nova Teutonia, Santa Catharina, Brazil; others from Isla Martín García, Argentina; *h* from lateral view): *p, r,* Anterior dorsum; *i, q,* face.

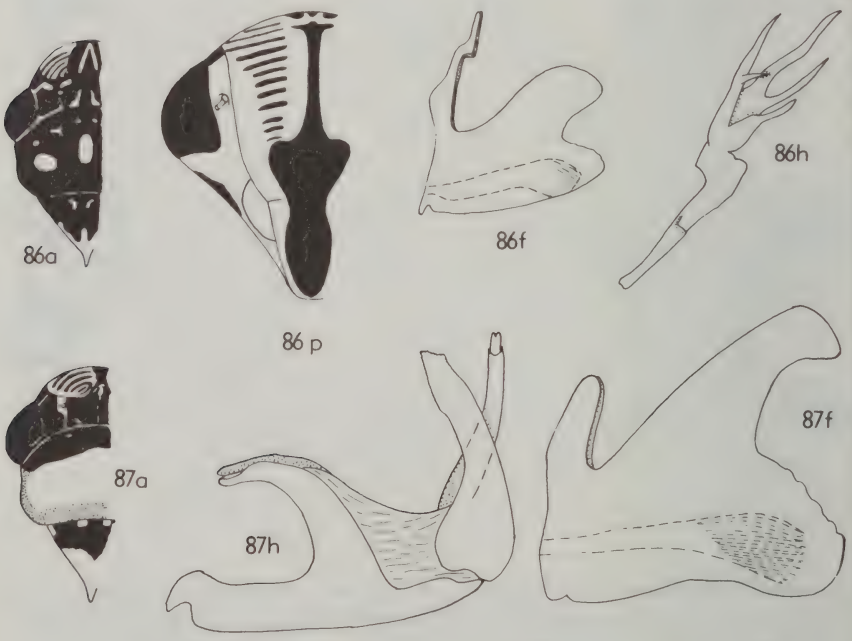
Dilobopterus adocetus, NEW SPECIES

FIGURE 106, PAGE 143

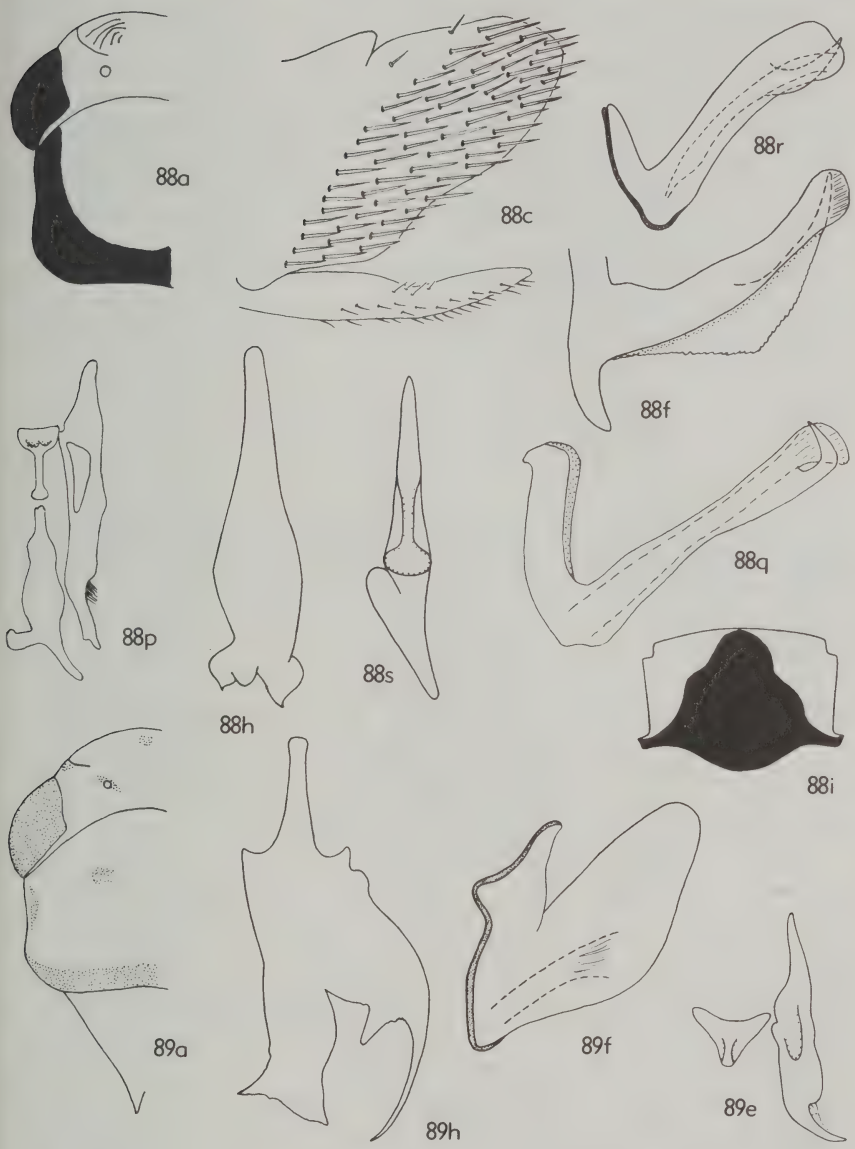
Length of male 11.0-12.4 mm. Head with median length varying from approximately four-tenths to almost six-tenths interocular width, and from one-fourth to slightly more than one-third transocular width, disk without a transverse concavity before ocelli; other head characters as in *D. fenestratus*, n. sp. Pronotum transversely rugose; forewing with veins distinct throughout; hindwing with jugal lobe not enlarged. Other external characters as in *fenestratus*.

Pygofer strongly produced, setae arranged much as in *D. syrphoidulus* (Jacobi); posteroventral margin without a process; plates not extending posteriorly as far as pygofer apex, much as in *syrphoidulus;* style and connective as in *D. politus* (Schmidt); aedeagus with a pair of lateral processes near apex; paraphyses as in illustration of *politus* (fig. 107*h*).

Color of anterior dorsum dull golden yellow to brownish yellow, crown varying from unmarked, through faintly marked with black, to marked with black as in accompanying illustration (fig. 106*a*); pronotum with a dark brown transverse stripe bordering posterior margin, with a much narrower and usually less distinct transverse stripe, occasionally incomplete, before mid-length, remainder as in ground color of crown or light brown. Forewing



FIGURES 86, 87.—86, *Dilobopterus disparulus*, n. sp., holotype (*h* from lateral view): *p*, Face. 87, *D. ponerus*, n. sp., holotype (*h* from lateral view).



FIGURES 88, 89. —88, *Dilobopterus exaltatus* (F.) (*a, f, h,* from specimen from Rio Autaz, Brazil: *i* from lectotype; *c, q, p,* from Rurrenabaque, Bolivia; *r, s,* from Bolivia): *q, r,* Aedeagus from lateral view; *h, s,* paraphyses from dorsal view; *p,* style, connective, and paraphysis, from dorsal view. 89, *D. lucentis,* n. sp., holotype.

hyaline with a broad fumose band in apical half extending before and behind a transverse corial orange vitta opposite claval apex. Face, thoracic pleura, and abdominal venter, yellow.

Holotype male, Monsón Valley, Tingo María, Peru, December 9, 1954 (E. I. Schlinger and E. S. Ross) and a long series of male topotypes, November and December, (CAS). Additional males from Rioja, Peru (USNM); Rio Tapiche, Peru, December (AMNH); 5 miles S. W. of Las Palmas, Huánuco, Peru, 1,000 m., December (CAS); "Peru" (RMS); Olivença and Pebas, Upper Amazon, Brazil (RMS); Coroico, Bolivia (OSU); San Antonio, Bolivia (RMS); unknown locality (MHNP).

D. adocetus, n. sp. is similar in facies to *D. politus* (Schmidt), but may be distinguished readily from this and all other species in the genus by the small paired apical aedeagal processes which are best seen in ventral view. Females of the species are unknown.

Dilobopterus axillaris, NEW SPECIES

FIGURE 90

Length of male 11.7 mm. Head with median length of crown varying from slightly less than four-tenths to slightly greater than four-tenths interocular width and from slightly less than one-fourth to slightly more than one-fourth

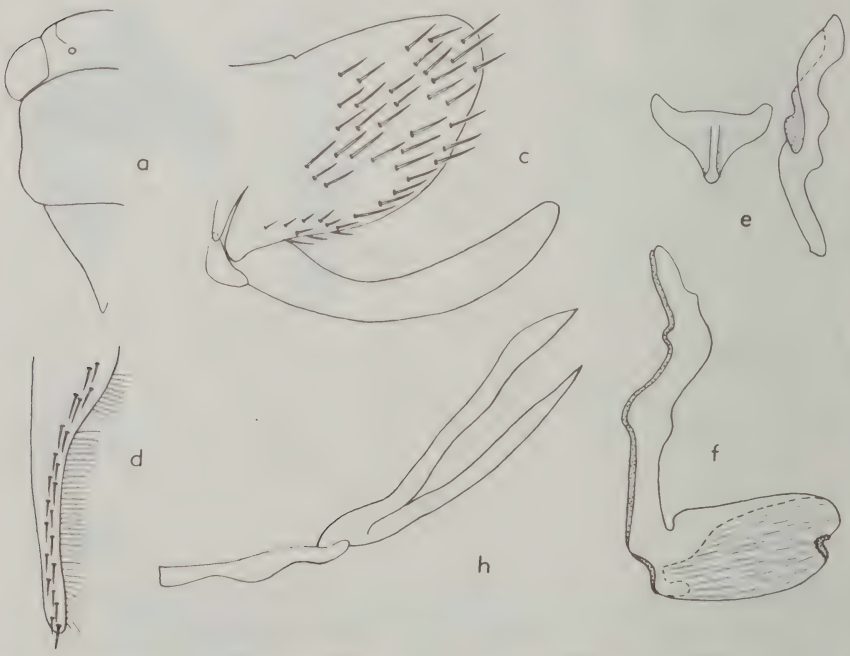


FIGURE 90.—*Dilobopterus axillaris*, n. sp., holotype (markings not shown in *a*; *h* from lateral view).

transocular width, anterior margin very broadly rounded in dorsal aspect; ocelli located behind a line between anterior eye angles and each approximately equidistant from adjacent eye angle and median line of crown, without a transverse concavity before ocelli; lateral clypeal sutures not attaining ocelli; antennal ledges with anterior margins obliquely rectilinear. Pronotum not transversely rugose; forewing with two membranous areas before apical membranous area, veins indistinct in basal half; hindwing with jugal lobe very greatly enlarged.

Pygofer moderately produced, with macrosetae sparse for the genus and irregularly dispersed on the disk, without processes; plates extending posteriorly beyond pygofer apex, each elongate, triangular, gradually narrowed in basal half, with multiseriate macrosetae throughout their length, style extending posteriorly considerably beyond apex of connective, without a preapical lobe; connective short, broadly Y-shaped, with a median keel; aedeagus symmetrical, without processes, in lateral view with shaft of equal width almost throughout length; paraphyses with a pair of asymmetrical rami arising near base.

Crown and anterior third of pronotum sordid yellow, posterior two-thirds of pronotum concolorous or (holotype) pinkish with an arcuate darker transverse band and a more posterior almost rectilinear transverse band, black, posterior margin narrowly black. Scutellum black, with basal angles and an arcuate transverse stripe behind and contiguous to transverse sulcus yellow or dull red (holotype). Forewing of holotype hyaline with commissural margin of clavus and costal margin both narrowly black, with an angulate marking at humeral angle, a smaller corial marking extending from costal margin, in basal third, and a transverse corial vitta extending from costal margin, narrowing across bases of anteapical cells, to inner margin of inner apical cell opposite claval apex, black (markings less distinct in second specimen). Hindwing with jugal lobe black, with an arcuate pale marking near its midlength. Face yellow, a pair of longitudinal stripes on clypeus, all of clypellus except mesal portion of base, and loral sutures, black.

Holotype male, Surinam (A. Dohrn) and an additional male, also from Surinam (RMS).

This species is more robust than any of the other species which have an enlarged jugal lobe. *D. axillaris,* n. sp., is most closely related to *D. laetus* (Walker), but it differs conspicuously in being shorter, in the markings of the anterior dorsum and the forewings, and in its shorter aedeagal apodemes.

Dilobopterus ponerus, NEW SPECIES

FIGURE 87, PAGE 126

Length of male 6.2 (type) - 6.6 mm. Head with median length varying from slightly less than one-half to slightly more than one-half interocular width and from approximately one-fourth to slightly more than one-third transocular width, anterior margin more narrowly rounded in dorsal aspect than in *D. axillaris,* n. sp.; ocelli located behind a line between anterior eye angles, with area before ocelli very shallowly concave. Forewing hyaline; hindwing with

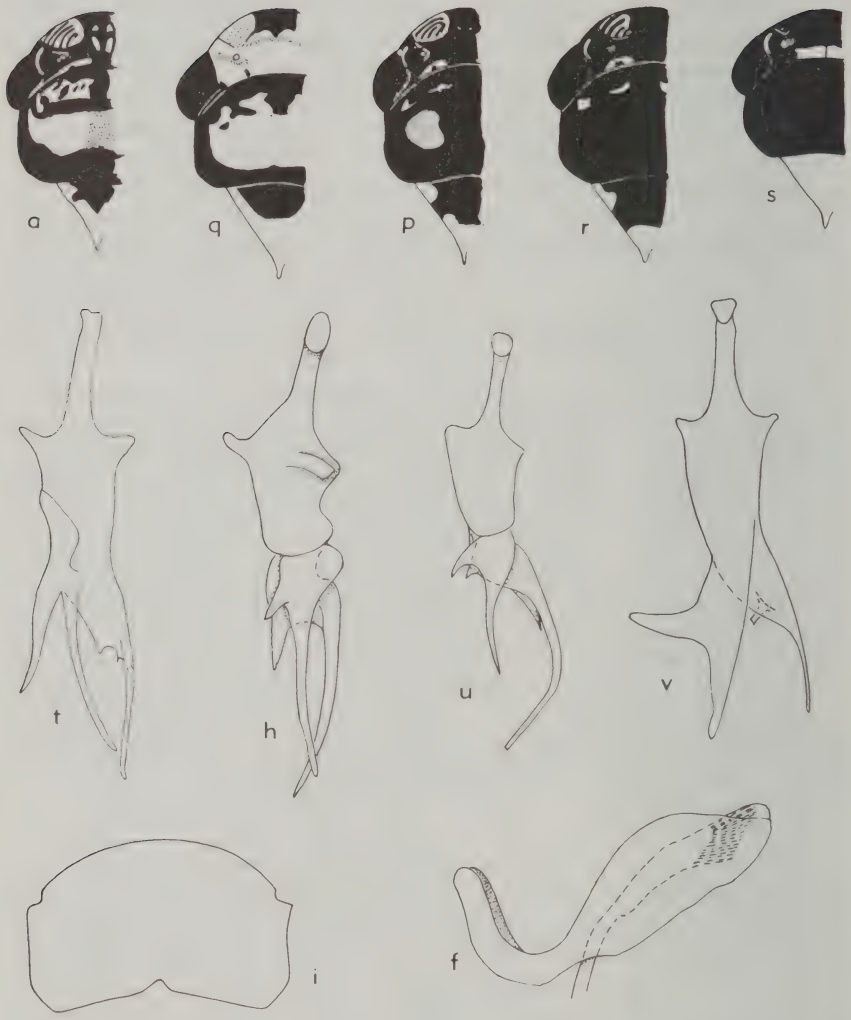


FIGURE 91.—*Dilobopterus demissus* (F.) (see also fig. 92) (*a, f, h, t,* from specimens from Chapada, Brazil; *i* from "Mexico"; *p* and *r,* from Monsón Valley, Peru; *q* from Maroni River, French Guiana; *s* from French Guiana; *u* from Santarém, Brazil; *v* from Tingo María, Peru): *h, t, u, v,* Paraphyses from dorsal view.

jugal lobe enlarged, in rest position extending posteriorly almost to claval apex of forewing. Other external structural characters as in *axillaris*.

Pygofer more slender and more produced than in *axillaris,* much as in illustration of *demissus* (Fabricius) (fig. 92*c*) except that setae are much more numerous; plates extending posteriorly almost as far as pygofer apex, each elongate, triangular, abruptly narrowed in basal half, with uniseriate macrosetae on apical three-fourths; style extending posteriorly considerably beyond apex of connective, with a preapical lobe; connective elongate for the genus, Y-shaped, the arms widely divergent, strongly keeled; aedeagus symmetrical with a conspicuous truncate dorsal process which is separated from shaft by a deep concavity; paraphyses consisting of a pair of basally directed basal processes and a pair of dorsally directed apical processes.

Crown black to amber, dorsal carinae of antennal ledges, a longitudinal marking behind each ocellus, a pair of oblique divergent markings on base, arcs between muscle impressions and a median cruciate marking, paler yellow. Pronotum amber, anterior margin broadly black, lateral and posterior margins dark; scutellum black in basal half, pale in apical half, with a pair of yellow spots on basal margin and with or without (type) a pair of black-centered circular yellow spots behind these; forewing hyaline with a brownish hyaline area in basal portions of outer anteapical cells which broadens and extends to costal margin. Face yellow with a broad median black stripe of irregular width over clypeus and clypellus, not covering lora.

Holotype male, Chapada, Brazil, November, from the Baker collection, one additional male, Rurrenabaque, Bolivia (USNM). One male, Tingo María, Peru (CAS). One male, Swedish Amazon Expedition, 1923-25 (remainder of label illegible) (RMS).

D. ponerus, n. sp., is closely related to *D. dispar* (Germar) but differs in the form of the aedeagus which has the dorsal lobe more deeply separated from the shaft than the Germar species. It differs also from *dispar* in the form of the paraphyses and in the markings of the anterior dorsum and face.

Dilobopterus disparulus, NEW SPECIES

FIGURE 86, PAGE 126

Length of male 7.1 (type) -7.7 mm. Head with median length varying from slightly less than six-tenths to slightly more than two-thirds interocular width and from one-third to slightly more than four-tenths transocular width, anterior margin in dorsal aspect much more narrowly rounded than in *D. axillaris,* n. sp.; ocelli located well behind a line between anterior eye angles and each approximately equidistant from adjacent eye angle and median line of crown, with a very shallow concavity near midlength; antennal ledges with anterior margins obliquely convex. Pronotum indistinctly transversely rugulose; forewing with a large hyaline area in basal two-thirds, veins indistinct; hindwing with jugal lobe greatly enlarged, in rest position extending posteriorly slightly beyond claval apex of forewing. Other external characters as in *axillaris*.

Pygofer moderately produced with posterior margin broadly rounded, setal pattern much as in *D. bimaculatus* Signoret (fig. 81*c*), without processes; plates not extending as far posteriorly as pygofer apex, each triangular, gradually tapered from base to apex, with uniseriate macrosetae from base to apex; style extending posteriorly much beyond apex of connective, with distinct preapical lobe; connective short, broadly Y-shaped, strongly keeled, aedeagus symmetrical with an unpaired dorsal lobe which is separated from shaft by a deep concavity; paraphyses asymmetrical, consisting of two main branches each of which is branched at least once.

Female abdominal sternum VII with a median posterior convexity which is truncate apically.

Crown, pronotum, and scutellum black, crown with a median apical narrow inverted V-shaped marking, a pair of median basal vittae, a pair of parentheses-shaped markings, one on each side, each interrupted by ocellus and connected basally with a narrow basal marginal stripe, inner ocular margins narrowly, a quadrate spot on each side anterolaterad of ocellus and connected with inner ocular marginal marking, arcuate markings in area of muscle impressions, yellow; pronotum with series of two to six (holotype)

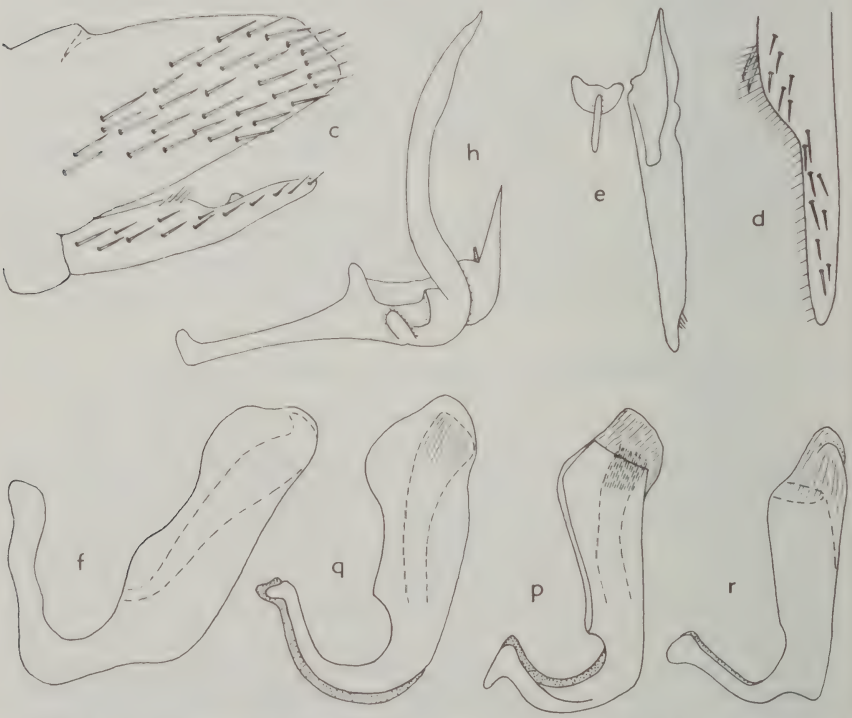
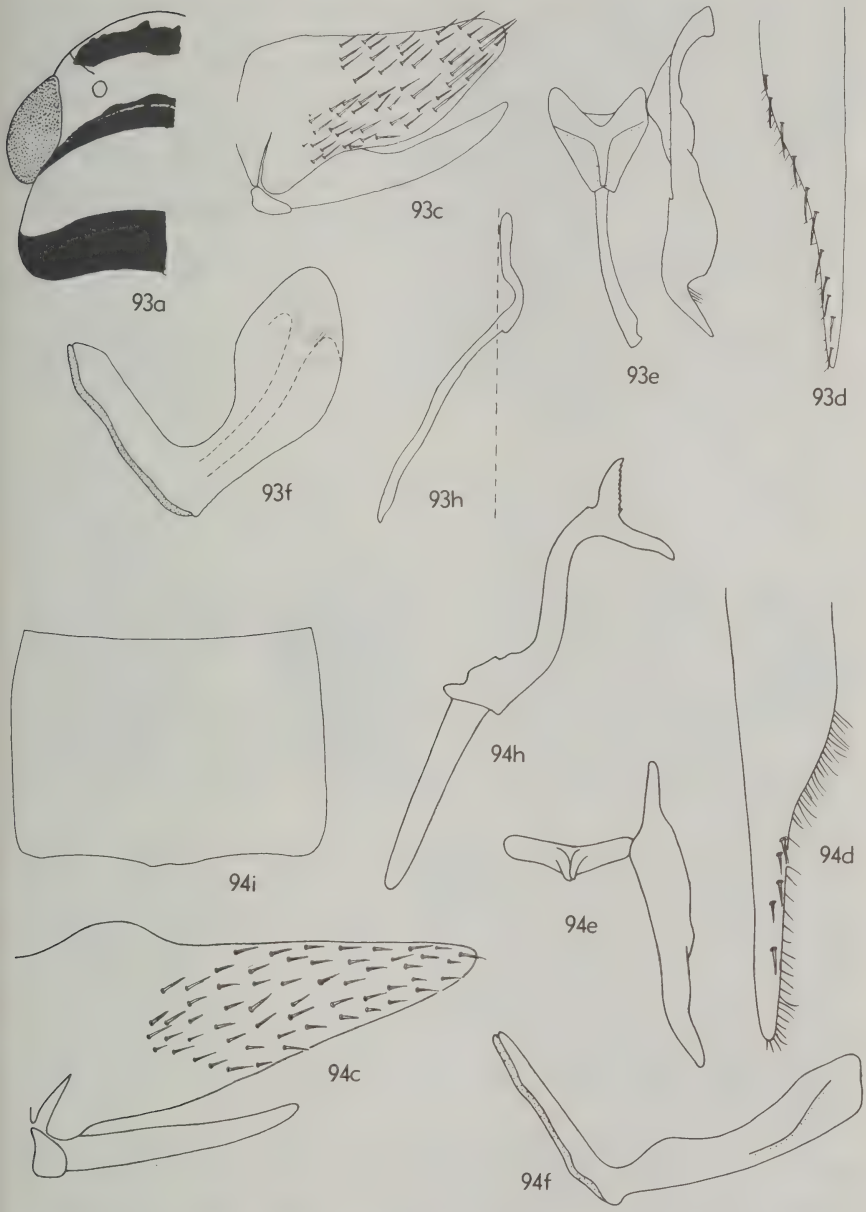


FIGURE 92.—*Dilobopterus demissus* (F.) (see also fig. 91) (*c, e, f, h,* from specimen from Cachuela Esperanza, Bolivia; *d, p, q,* from Tingo María, Peru; *r* from Santarém, Brazil; *h* from lateral view): *p, q, r,* Aedeagus from lateral view.



FIGURES 93, 94.—93, *Dilobopterus guadulpensis* (Lethierry) (*h* from lectotype of *Tettigonia fastigiata* Uhler, from St. Vincent, W. I.; remainder from Basse Terre, Guadeloupe; *e* with paraphysis shown). 94, *D. gaudens* (Walker) (*c-f*, from specimen from Ega, Amazonas; *i* from Achinamiza, Peru; *h* from lateral view).

small submarginal spots near anterior margin and three large spots across disk, yellow; scutellum with narrow inconspicuous linear marking in each basal angle, a pair of reversed parentheses-shaped markings near anterior margin, apex and a median and two lateral lines extending anteriorly from it, yellow; forewing with base, humeral, commissural and costal margins, most of anteapical cells, apical cells, and claval suture, black, enclosing hyaline area. Face with median black marking of variable width over clypeus and clypellus.

Holotype male, July 15, one additional male, August 28, and one male, August 21, Iguassú, Bahia, Brazil (Roman), Swedish Amazon Expedition (RMS). Three females, Bonito, Permambuco Province, Brazil, on cotton, January 1, January 18, and August 1, 1883 (USNM).

D. disparulus, n. sp., is closely related to *D. dispar* (Germar), but differs in its smaller size (the Germar species varying from 8.3-9.3 mm in length), in lacking the orange anteapical spot of the forewing and in the three large transverse spots of the pronotum.

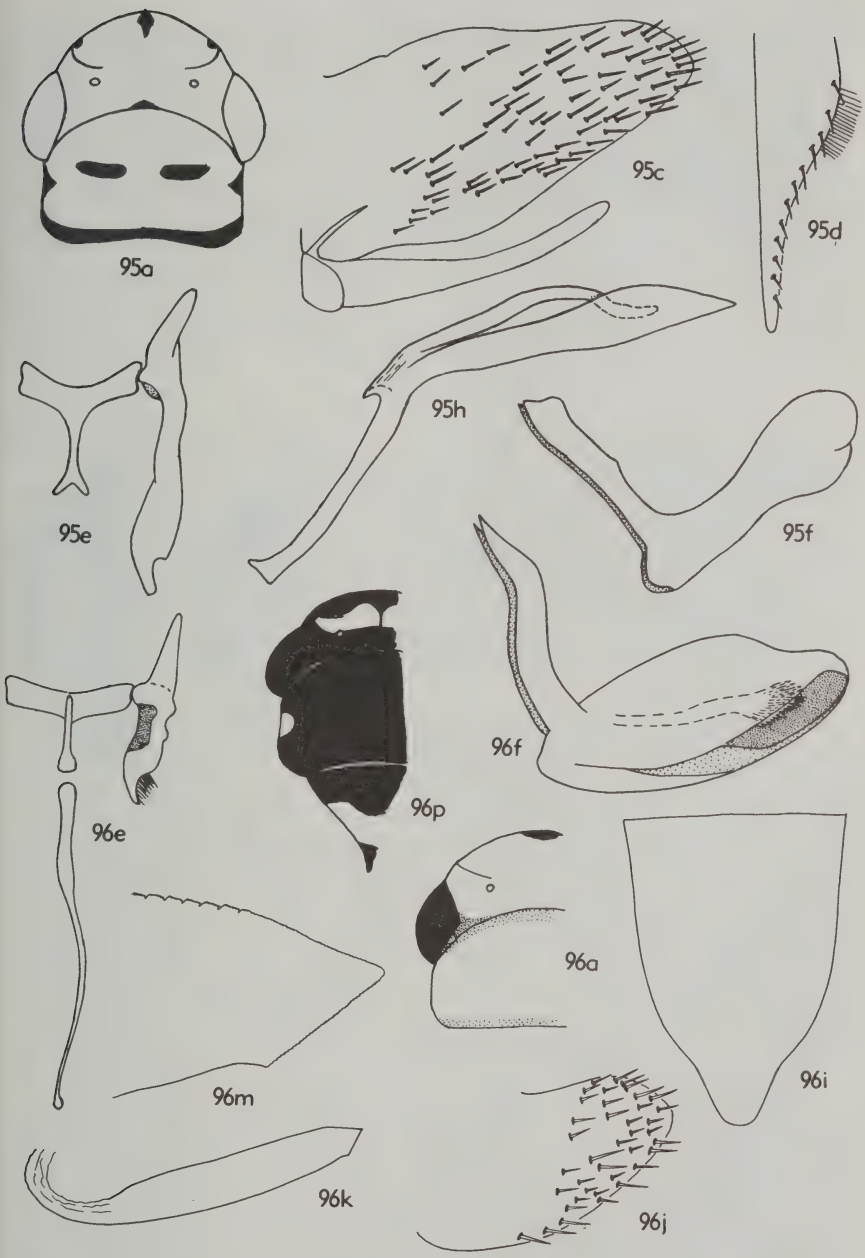
Dilobopterus lobatus, NEW SPECIES

FIGURE 72, PAGE 118

Length of male 7.5 mm. Head with median length slightly more than half interocular width and slightly more than one-third transocular width; ocelli located behind a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, crown flattened between ocelli; antennal ledges with anterior margins obliquely convex in lateral view. Forewing membranous discally and apically, veins distinct. Hindwing with jugal lobe greatly enlarged, extending almost to claval apex of forewing with wings in rest position. Other external structural characters as in *D. axillaris*, n. sp.

Pygofer well produced, with macrosetae close-set and numerous, without processes; plates not extending posteriorly as far as pygofer apex, each triangular, gradually narrowed from base to apex, with multiseriate macrosetae on apical two-thirds; style extending posteriorly considerably beyond apex of connective, with a slight preapical lobe; connective short, very broadly Y-shaped, not keeled medially; aedeagus asymmetrical, shaft digitiform, arcuate, with a very large asymmetrical process arising dorsally at its base and broader than shaft, gradually narrowed and bifurcate apically; with an unpaired asymmetrical paraphysis which is elongate, bisinuate, and acute apically.

Color of crown and pronotum sordid yellow, crown with a diagonal stripe between eye and muscle impressions on anterior margin on each side, the margins of a median apical areole, and a basal spot behind each ocellus, black; anterior, lateral and posterior margins of pronotum broadly black, the inner margin of the black border very irregular in outline; scutellum black in basal half, apical half yellow; forewing hyaline, with base, humeral margin, commissural margin, costal margin, claval suture and an area across anteapical cells, fumose to black, outlining a large membranous discal area of



FIGURES 95, 96.—95, *Dilobopterus hyalinatulus* (Osborn) (*a* from holotype; remainder from specimen from Barro Colorado Island, Panama C. Z.; *h* from lateral view). 96, *D. obliquatulus* (Jacobi) (*a,* female from Callanga, Peru; *p,* male from Monsón Valley, Peru; *e, f,* from Bogotá, Colombia; *i, j, k, m,* from Chanchamayo, Peru): Paraphysis included in *d.*

wing which appears interrupted by the black jugal lobe of the hindwing beneath when the wings are at rest, apical cells hyaline. Face yellow with a broad median black stripe extending over clypeus and clypellus and including the lora.

Holotype male, Archibald Estate, Roxborough, Tobago, November 6, 1918 (Harold Morrison) in USNM.

D. lobatus, n. sp., differs from all other species in the genus in the very long lobe of the aedeagus which is separate from the shaft almost throughout its length and in the elongate slender form of the shaft.

Dilobopterus costalimai, NEW SPECIES

FIGURE 80, PAGE 122

Length of male 8.8 mm, of female 8.8-9.1 mm. Head with median length of crown varying from slightly less than four-tenths to almost six-tenths interocular width and from slightly less than one-third to almost four-tenths transocular width, anterior margin much more produced than in *D. axillaris*, n. sp., and with anterior margin rounded in dorsal aspect; antennal ledges with anterior margins obliquely convex in lateral view, without a dorsal carina. Forewing with a large discal membranous area, claval veins indistinct; hindwing with jugal lobe greatly enlarged and extending posteriorly beyond claval apex of forewing with wings in rest position. Other external structural characters as in *axillaris*.

Pygofer moderately produced, somewhat abruptly rounded at apex, macrosetae numerous and irregularly dispersed on disk, with a short weak apical process in dorsal aspect; plates not extending as far posteriorly as pygofer apex, each short, triangular, gradually narrowed throughout length, with apex rounded, with multiseriate macrosetae almost throughout length; style extending posteriorly considerably beyond apex of connective, with a distinct preapical lobe; connective short, Y-shaped, with arms widely divergent, strongly keeled; aedeagus symmetrical, with short blunt lobe extending posterodorsally, rounded apically, scarcely separated from shaft; paraphyses asymmetrical, consisting of a slender weak ramus arising near base of a larger somewhat chelate ramus which may be toothed (type).

Female abdominal sternum VII with posterior margin slightly convex on each side of a very shallow median concavity.

Crown, pronotum and scutellum yellow to orange, crown with arcuate margins of muscle impressions broadly black, median line in its basal two-thirds, expanded apically to connect on each side with arcuate margins, and with a short slightly curved marking extending posteriorly from each ocellus to posterior margin of crown, black; anterior pronotal margin narrowly and markings completely surrounding an orange to yellow somewhat W-shaped discal pronotal marking, black; a broad median Y-shaped marking on scutellum and a short, narrow marking on each side from arm of "Y" to adjacent lateral scutellar margin, black. Forewing with costal margin broadly, humeral and commissural margins, claval suture and corial longitudinal veins

occasionally, black, occasionally with few fuscous markings in apical and anteapical cells. Face yellow to orange with a short median clypeal black marking. Thoracic pleura and legs orange to yellow, tarsal claws black.

Holotype male, Chapada, Brazil, September; two females, same data, April; one male, Bella Vista, Argentina, July 2, 1927 (Max Kusluik), in Citrus grove; one female, São Paulo, Brazil, July 10 (E. J. Hambleton); one female, Campinas, São Paulo, Brazil, February 10, 1936 (E. J. Hambleton); one female, Asunción, Paraguay, July, 1961 (N. L. H. Krauss) (USNM). One female, São Paulo, Brazil (RMS). One female, Mburucaya, Corrientes, Argentina, November 16-23, 1957 (M. Biraben) in collection of Museo de la Plata. One female, Barra do Tapirape, Mato Grosso, Brazil, January 1, 1963 (B. Malkin) (CAS).

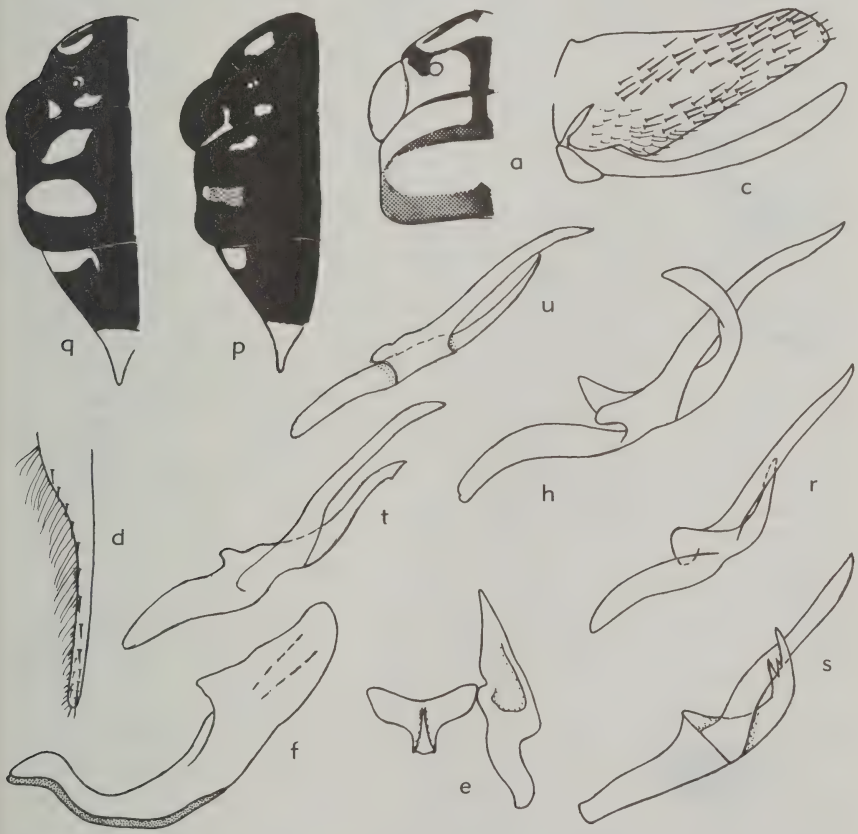
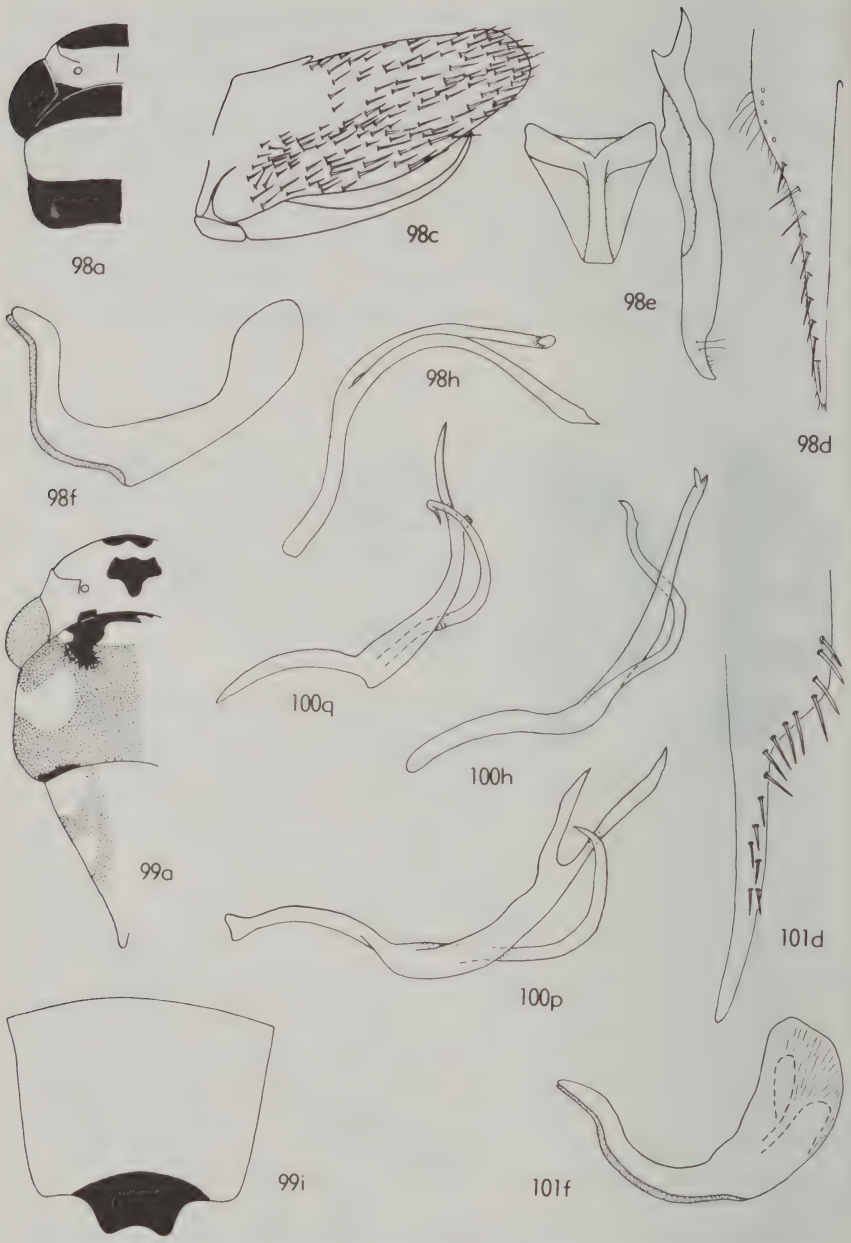


FIGURE 97.—*Dilobopterus syrphoidulus* (Jacobi) (*a, c, d, f, h, s,* from specimens from Peru; *e, p, q,* from Monsón Valley, Peru; *r* from lectotype; *t, u,* from Chapada, Brazil): *h, r, s, t, u,* Paraphyses from lateral view.



FIGURES 98-101.—98, *Dilobopterus knighti*, n. sp. holotype (*h* from lateral view). 99, *D. cynthia* (Fowler), (from specimen from Panama). 100, *D. errabundus*, n. sp., paraphyses from lateral view (*h* from specimen from Bogotá, Colombia; *p, q,* from Colombia). 101, *D. nigrovenosus,* n. sp., holotype.

D. costalimai, n. sp. is closely related to *D. dispar* (Germar) from which it may be distinguished by the distinctive markings of its anterior dorsum and in the aedeagus which lacks the stronger separation between the lobe of the aedagus and shaft of the Germar species.

This species is named in honor of Angelo M. da Costa Lima whose work has contributed much to our knowledge of neotropical Homoptera.

Dilobopterus manni, NEW SPECIES

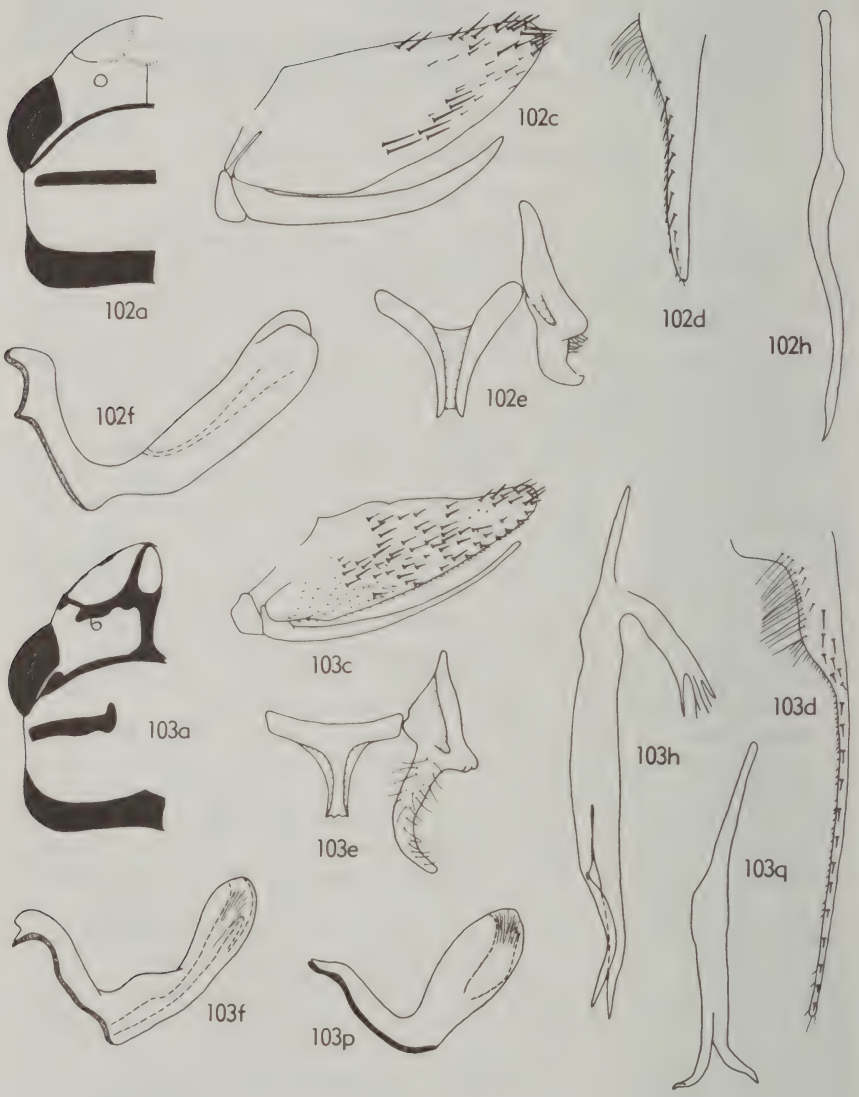
FIGURE 83, PAGE 124

Length of male 8.4 mm. Head with median length of crown slightly greater than one-half interocular width and one-third transocular width, anterior margin much more produced than in *D. axillaris,* n. sp., very broadly rounded in dorsal aspect; antennal ledges with anterior margins obliquely convex, without a dorsal carina. Forewing with a single membranous area before apical membrane, veins indistinct in basal one-half; hindwing with jugal lobe enlarged. Other external characters as in *axillaris.*

Pygofer well produced with macrosetae close-set and fairly uniformly dispersed, with short mesally directed process from each dorsal margin in dorsal aspect; plates not extending posteriorly as far as pygofer apex, each slender, triangular, abruptly narrowed in basal third, with uniseriate macrosetae throughout most of length; style extending posteriorly much beyond apex of connective, with a preapical lobe; connective short, Y-shaped with stem very short and arms widely divergent, without a median keel; aedeagus symmetrical with a prominent dorsal lobe separated from shaft by an angular excision; paraphyses asymmetrial, consisting of two elongate asymmetrical slender rami arising from base, one of these branched at apex.

Crown black, an anchor-shaped marking at apex, a pair of reversed parentheses-shaped markings near middle of base, several arcs in area of muscle impressions, a C-shaped marking tangential to each inner eye margin, a short pale marking before each ocellus, an angular spot laterad of preceding, a narrow laterobasal marginal marking extending from behind each ocellus parallel to posterior eye margin, yellow; pronotum greenish yellow, lateral and posterior margins fuscous, anterior margin black with a number of irregular yellow markings; scutellum black with a pair of median markings near base, basal angles narrowly, and entire apical half, yellow. Forewing hyaline, costal margin to bases of apical cells, humeral margin, commissural margin, claval suture, black, a broad transverse fuscous area through bases of anteapical cells, including basal halves of latter, and attaining commissural margin; hindwing with jugal lobe black, extending posteriorly slightly beyond midlength of clavus with wings in rest position. Face yellow with a median longitudinal black stripe which is bifurcate basally, expanding ventrally to include all of clypellus and portion of lora and genae. Thoracic pleura and legs except at their black bases and apices, pale yellow.

Holotype male, Rurrenabaque, Beni, Bolivia, December, 1921 (William M. Mann), Mulford Biological Exploration, 1921-1922 (USNM). One male, 4



FIGURES 102, 103.—102, *Dilobopterus bracteatulus* (Jacobi) (*a* from specimen from Peru; remainder from Itaituba, Brazil; *h* from dorsal view). 103, *D. jemima* (Distant) (*p*, *q*, from specimen from Covendo, Bolivia; remainder from Tingo María, Peru; *h* from dorsal view): *p*, Aedeagus from lateral view; *q*, paraphyses from dorsal view.

miles E. Río Acobamba, Junin Prov., Peru, December 3, 1954 (E. I. Schlinger and E. S. Ross) (CAS).

D. manni is named in honor of the collector of the holotype, the late Dr. William M. Mann, former director of the National Zoological Park, Washington, D. C. who collected many interesting Homoptera in tropical America. The species is closely related to *D. selvanus,* n. sp. (below) in the discussion of which distinguishing characters are presented.

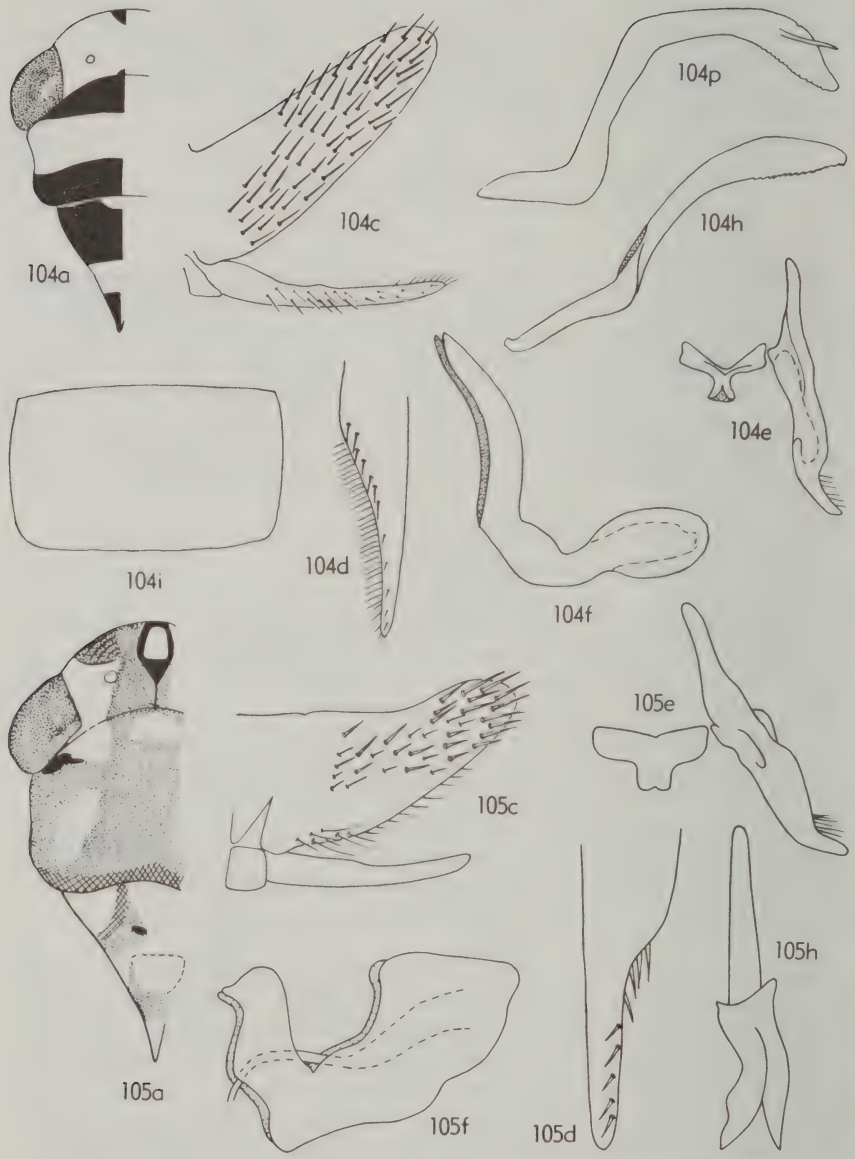
Dilobopterus selvanus, NEW SPECIES

FIGURE 82, PAGE 124

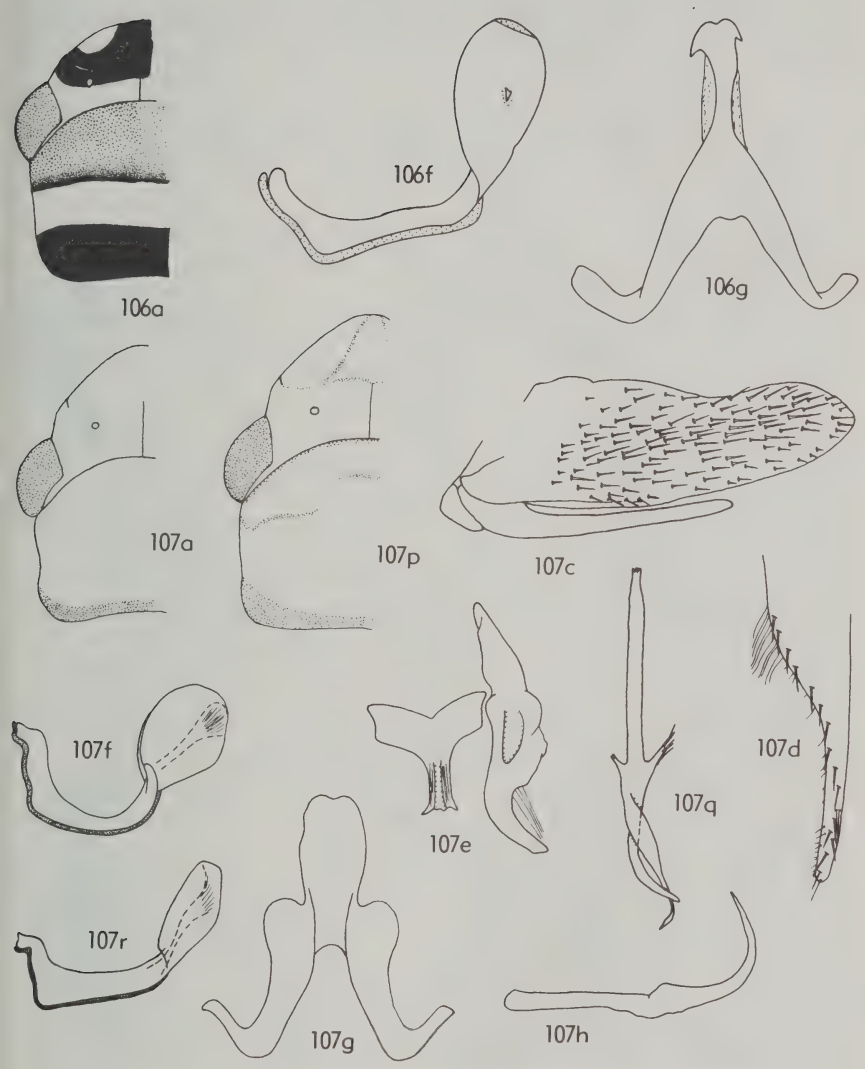
Length of male 7.6 mm. Head with median length of crown slightly less than one-half interocular width and slightly more than one-fourth transocular width, anterior margin much more strongly produced than in *D. axillaris,* n. sp., very broadly rounded in dorsal aspect; ocelli located behind a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, with a transverse concavity across ocelli; antennal ledges with anterior margins obliquely convex. Forewing almost entirely membranous, veins indistinct in basal half. Other structural characters as in *axillaris.*

Pygofer well produced with macrosetae numerous and close-set, occurring over most of disk except basidorsal portion and a narrow diagonal area extending from near base posterodorsally to apical portion of disk, with a well developed dorsal process curved strongly mesally, concavely truncate apically, not extending to median line; plates not extending nearly as far posteriorly as pygofer apex, each triangular, abruptly narrowed in basal half, broadened slightly before apex, with multiseriate small macrosetae; style extending posteriorly much beyond apex of connective, with a preapical lobe; connective Y-shaped, with arms widely divergent, keeled medially; aedeagus symmetrical with a dorsal lobe extending posterodorsally almost parallel to shaft, separated from latter by a narrow, deep excision; paraphyses asymmetrical, consisting of a broad ramus extending dorsally then curved posteriorly, somewhat hooked apically, and of a much narrower slender shorter tapering process arising at base of larger ramus and not extending as far as apex of latter.

Crown, pronotum, and scutellum sordid yellow, crown with anterior margin broadly black except a median anchor-shaped marking, arcs in areas of muscle impressions and a C-shaped marking tangential to each inner eye margin all of which are yellow, pronotum with margins black, the anterior margin including a number of angular, arcuate or lobate very small yellow spots and a larger quadrate median yellow spot near anterior margin, scutellum yellow with basal angles and transverse suture black, latter with a median angular posteriorly-directed extension; forewing hyaline, with costal margin narrowly black; hindwing with jugal lobe black, extending posteriorly beyond apex of clavus of forewing with wings in rest position. Face yellow with a broad black median stripe across clypeus and all of clypellus and most of lora and adjacent genae. Thoracic pleura and legs except fuscous apical halves of hind tibiae, yellow.



FIGURES 104, 105.—104, *Dilobopterus fastuosus* (F.) (*i* from specimen from Tingo María, Peru; *p* from Rio Autaz, Brazil; remainder from holotype of *Cicadella terminalis* Osborn): *h, p,* Paraphysis, from lateral view. 105, *D. chiriquensis* (Fowler), lectotype (*h* from dorsal view).



FIGURES 106, 107.—106, *Dilobopterus adocetus,* n. sp. (*a* from specimen from Upper Amazonas; *f, g,* from Bolivia). 107, *D. politus* (Schmidt) (*a, d, f, h,* from specimen from Baños, Ecuador; *c, g, p-r,* from Tingo María, Peru; *q* from Chanchamayo, Peru; *h* from lateral view): *p,* Anterior dorsum; *q,* paraphyses from dorsal view; *r,* aedeagus from lateral view.

Holotype male, "Karlingdale", Porto Velho, Mato Grosso, Brazil, September 3, 1943 (Mark Taylor) on indefinite loan to USNM from NCS.

D. selvanus, n. sp., is very closely related to *D. manni*, n. sp., from which it may be distinguished by its less extensive dark markings of the forewing, the longer jugal lobe of the hindwing, the truncate apex of the pygofer process, the narrower dorsal aedeagal lobe, and its narrower basal ramus of the paraphyses.

Dilobopterus lucentis, NEW SPECIES

FIGURE 89, PAGE 127

Length of male 7.5 mm. Head with median length of crown two-thirds interocular width and slightly more than one-third transocular width, anterior margin more produced than in *D. axillaris*, n. sp., with anterior margin very broadly rounded in dorsal aspect; lateral clypeal sutures attaining ocelli (type) or not. Forewing entirely membranous, veins distinct; hindwing with jugal lobe enlarged. Other external characters as in *axillaris*.

Pygofer and plates as in *D. demissus* (Fabricius) (fig. 92*c*); style extending posteriorly much beyond apex of connective, with a distinct preapical lobe; connective subtriangular, with a median keel; aedeagus symmetrical, without processes; aedeagus with dorsoapical portion expanded dorsally considerably beyond gonopore, but not separated from shaft by an excision; paraphyses consisting of a pair of asymmetrical rami arising near base (fig. 89*h*).

Crown, pronotum, and scutellum tan, crown with a median and two lateral submarginal spots and area around ocelli narrowly, pronotum with a pair of discal spots, a longitudinal vitta on each side near lateral margin, and posterior margin broadly, black; forewing unmarked; hindwing with anteapical portion of jugal lobe black, extending posteriorly almost as far as claval apex of forewing with wings in rest position. Face, thoracic pleura and sterna, pale yellow with a median elliptical black spot near base of clypeus.

Holotype male, Bartica, British Guiana, June, 1920, (inner apical cells of forewings missing) (AMNH). One damaged specimen, hindlegs covered with mold and with abdomen missing (ZIMH).

Dilobopterus lucentis, n. sp., in external appearance is most closely related to *D. bimaculatus* Signoret. It differs from the Signoret species in that the dorsal lobe of its aedeagus is not nearly as distinct from the aedeagal shaft, in that the pygofer is more produced posteriorly, in its unpaired median spot of the crown and its paired lateral submarginal spots of the crown, in its paired sublateral pronotal vittae, its dark posterior pronotal margin, its lack of markings on the scutellum and the lack of a fuscous apical portion of the forewing.

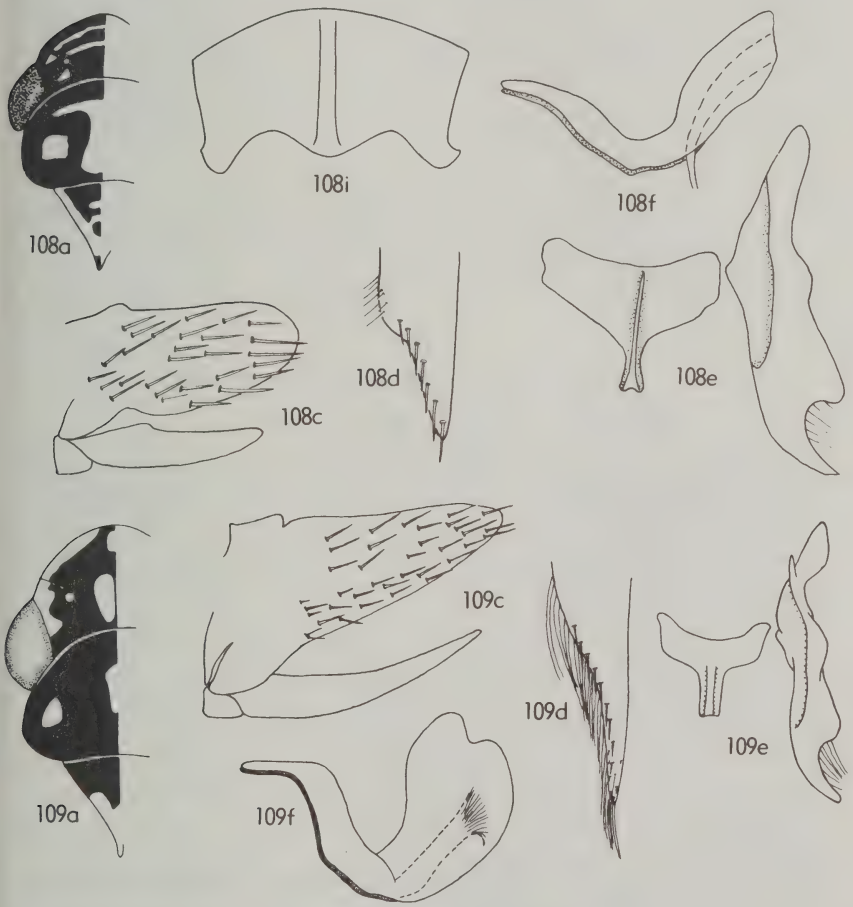
Dilobopterus myersi, NEW SPECIES

FIGURE 73, PAGE 118

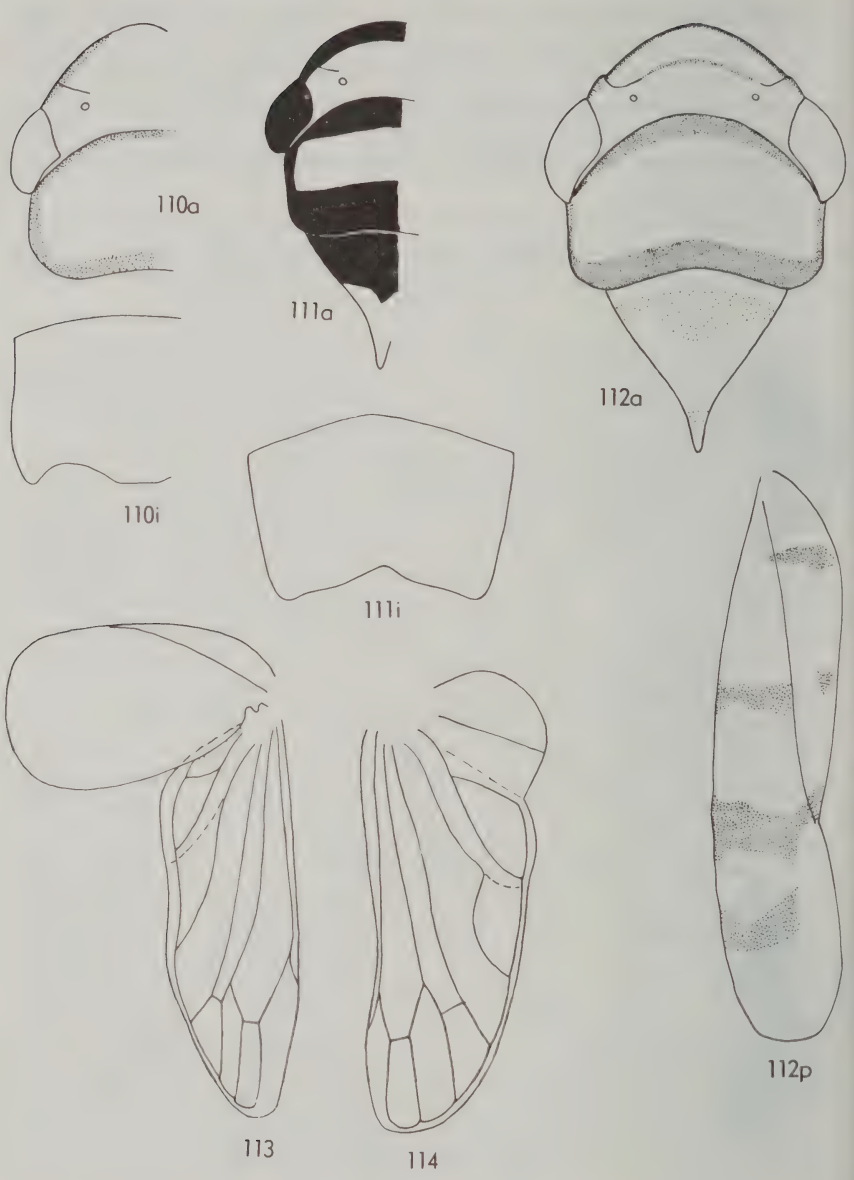
Length of male 7.4 mm, of female 7.9 mm. Head with median length of crown one-half or slightly less than one-half interocular width and approximately three-tenths transocular width, anterior margin broadly rounded

in dorsal view; ocelli located behind a line between anterior eye angles and each slightly closer to adjacent anterior eye angle than to median line of crown, without a transverse concavity before ocelli; lateral clypeal sutures not attaining ocelli; antennal ledges with anterior margins obliquely convex, each with a longitudinal slightly concave dorsal area. Pronotum without sculpturing; forewing mostly membranous, the veins distinct; hindwing with jugal lobe greatly enlarged.

Male pygofer moderately produced, with macrosetae of several lengths on posterior half of disk, without pygofer processes; plates not extending posteriorly nearly as far as pygofer apex, each triangular and rounded



FIGURES 108, 109.—108, *Dilobopterus corixoides* (Fowler) (*a, i,* from lectotype; remainder from specimen from La Ceiba, Honduras). 109, *D. minutalis,* n. sp. (*a* from specimen from 2 miles NE. of San Miguel, Cozumel, Mexico; remainder from Orizaba, Mexico).



FIGURES 110-114.—110, *Dilobopterus aubei* (Signoret), lectotype (left side of sternum VII damaged, not shown). 111, *D. croceus* (Metcalf) (*a* from lectotype of *Tettigonia aestuans* Walker; *i* from specimen compared with lectotype). 112, *D. frenatus* (Taschenberg) (from holotype of *Cicadella subhyalina* Osborn): *p*, Sketch of forewing, *in situ*. 113 and 114, *Dilobopterus* spp. hindwings.

apically, with multiseriate longitudinal macrosetae on apical two-thirds; style extending posteriorly much beyond apex of connective, with a distinct preapical lobe; connective T-shaped with stem very short, keeled medially (style and connective much like present illustration of *D. costalimai,* n. sp., fig. 80*e*); aedeagus asymmetrical, with two tapering acute apical processes, one extending posterolaterally and one basally along shaft; paraphysis unpaired, not in median sagittal plane, elongate, very slender, rounded at apex.

Female abdominal sternum VII much as in *D. costalimai,* n. sp., but with median portion slightly more produced.

Crown, pronotum, and scutellum yellow with olive reflections; forewing hyaline, in rest position exposing the black jugal lobe of the hindwing beneath, costal margin broadly castaneous from base to a point opposite midlength of outer anteapical cell, claval suture narrowly castaneous. Face yellow with a broad median line extending from apical portion of clypeus to apex of clypellus. Thoracic pleura and legs pale.

Holotype male and one female, Trinidad, January 27, 1929 (J. G. Myers), "B. M. 1929-170" (BM).

D. myersi, n. sp., is probably most closely related to *D. lobatus,* n. sp., from which it differs markedly in the form of the aedeagus in lateral view and in its quite different color of the anterior dorsum. The species is named in honor of Dr. J. G. Myers, who published several important works on the Homoptera and who collected the type-specimen.

Dilobopterus minutalis, NEW SPECIES

FIGURE 109, PAGE 145

Length of male 5.6-6.1 mm., of female 6.8 mm. Head with median length of crown varying from slightly less than six-tenths to almost seven-tenths interocular width and from slightly more than one-third to slightly less than four-tenths transocular width, anterior margin broadly rounded in dorsal view; ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, without a transverse concavity before ocelli; lateral clypeal sutures usually attaining ocelli; antennal ledges with anterior margins obliquely convex, without a concave dorsal area. Pronotum without sculpturing; forewings membranous apically but with membrane not sharply delimited at its base; hindwing with jugal lobe not enlarged.

Male pygofer moderately produced and narrowly rounded dorsoapically, macrosetae numerous on apical half, without processes; plates not extending posteriorly as far as pygofer apex, each triangular and gradually tapered, with uniseriate macrosetae and a number of microsetae; style extending posteriorly well beyond apex of connective, with a distinct preapical lobe; connective Y-shaped with arms widely divergent, with a median keel; aedeagus symmetrical, with a convex dorsoapical lobe; paraphyses absent.

Ground color of dorsum, including forewings, black, crown with a larger median basal spot and a smaller anteapical spot, orange, anterolateral

margins and an area adjoining each inner eye margin, dull yellow; pronotum with a median and two lateral spots orange, variable in size; scutellum with at least a posterior yellow V-shaped marginal marking, at most with entire median area broadly yellow; forewings varying from unmarked to orange-spotted, at most with two spots in clavus and four spots on corium. Face, thoracic pleura, and legs unmarked yellow except a black spot at apex of head.

Holotype male, Miguel, Cozumel, Quintana Roo, Mexico, July, 1959 (N.L.H. Krauss); one male and one female, 2 miles NE of San Miguel, Cozumel, April 3, 1960 (J.F.G. Clarke) (USNM). One male, Fortin de las Flores, Vera Cruz, Mexico, 2,500-3,000 ft., August 14, 1963 (H. V. Weems) (SPBF). One male, Orizaba, Mexico, 2,500 ft., February 13, 1954 (R. R. Dreisbach).

D. minutalis, n. sp. has more variability in color and size than most other species of the genus.

16. Genus **LISSOSCARTA** Stål

Figures 115-120

Lissocarta Stål, 1869a:69. Type-species: *Cicada vespiformis* Fabricius, by monotypy.

Length of male 14.0-17.0 mm, of female 15.5-17.0 mm.

Head moderately produced, its median length from four-tenths to almost two-thirds its interocular width, and from less than one-fourth to almost four-tenths transocular width, anterior margin broadly rounded in dorsal view, ocelli located behind a line between anterior eye angles, each approximately equidistant from median line and adjacent anterior eye angle, surface of crown convex, lateral clypeal sutures extending onto crown, almost attaining ocelli; antennal ledges with anterior margins obliquely rectilinear in lateral view, without a concavity; face with clypeus very strongly convex, transclypeal suture incomplete, clypellus not tumid, its contour continuing curved profile of clypeus. Other head characters as in *Dilobopterus* Signoret.

Thorax with lateral margins parallel; surface with sculpturing, other characters as in *Dilobopterus*. Forewing completely hyaline, veins distinct, with four elongate apical cells and with base of fourth opposite or slightly more proximal than base of third apical cell; wings of female in rest position exceeding apex of ovipositor. Hindwing much shorter than forewing, with a slightly enlarged jugal lobe which is partially separated from remainder of wing by an excision. Posterior meron exposed with forewing in rest position; other thoracic characters as in *Dilobopterus*. Abdomen strongly constricted at base.

Male genitalia: Pygofer well produced, with macrosetae numerous, usually not uniformly dispersed, lacking in basidorsal area, processes present or absent. Plates slender, elongate, triangular, separate throughout their length, with longitudinally uniseriate macrosetae and with a number of microsetae. Style extending posteriorly considerably beyond apex of connective without a preapical lobe. Connective T-shaped or short Y-shaped. Aedeagus symmetrical, with or without processes. Paraphyses asymmetrical.

Female abdominal sternum VII with posterior margin varying interspecifically. Ovipositor and pygofer as in *Dilobopterus*.

Specimens belonging to the genus *Lissoscarta* have been studied from British Guiana, northeastern, central, and northwestern Brazil, from Peru, and Bolivia. *Lissoscarta* is closely related to *Dilobopterus* from which it may be distinguished by its larger size, the consistently membranous forewing and the constriction at the base of the abdomen.

The lectotype of *Cicada vespiformis* Fabricius is a female, and it was not dissected. The type-locality was South America. Most of the Fabricius species of Cicadellinae with such a type locality have proven to be from the Guianas, and since only one species in the genus has been found from the Guianas in the present study, I have assumed that this is *vespiformis*.

The color markings of the anterior dorsum of all of the species are fairly similar, and the accompanying illustration of *L. vespiformis* (Fabricius) (fig. 115*a*) and the color description of *L. schlingeri*, n. sp., will serve for all, except for some differences in the markings of the crown.

SPECIES OF *LISSOSCARTA*

(*known only from males; **known only from females)

catutara, n. sp. NW. Brazil.
**nipata*, n. sp. Peru.
***pebasensis*, n. sp. NW. Brazil.
**pereneensis*, n. sp. Peru, Bolivia, Central Brazil.
schlingeri, n. sp. Peru.
vespiformis (Fabricius), 1803a:68 (*Cicada*). Br. Guiana, NE. Brazil.
micans (Fabricius), 1803a:69 (*Cicada*).

KEY TO MALES OF *LISSOSCARTA*

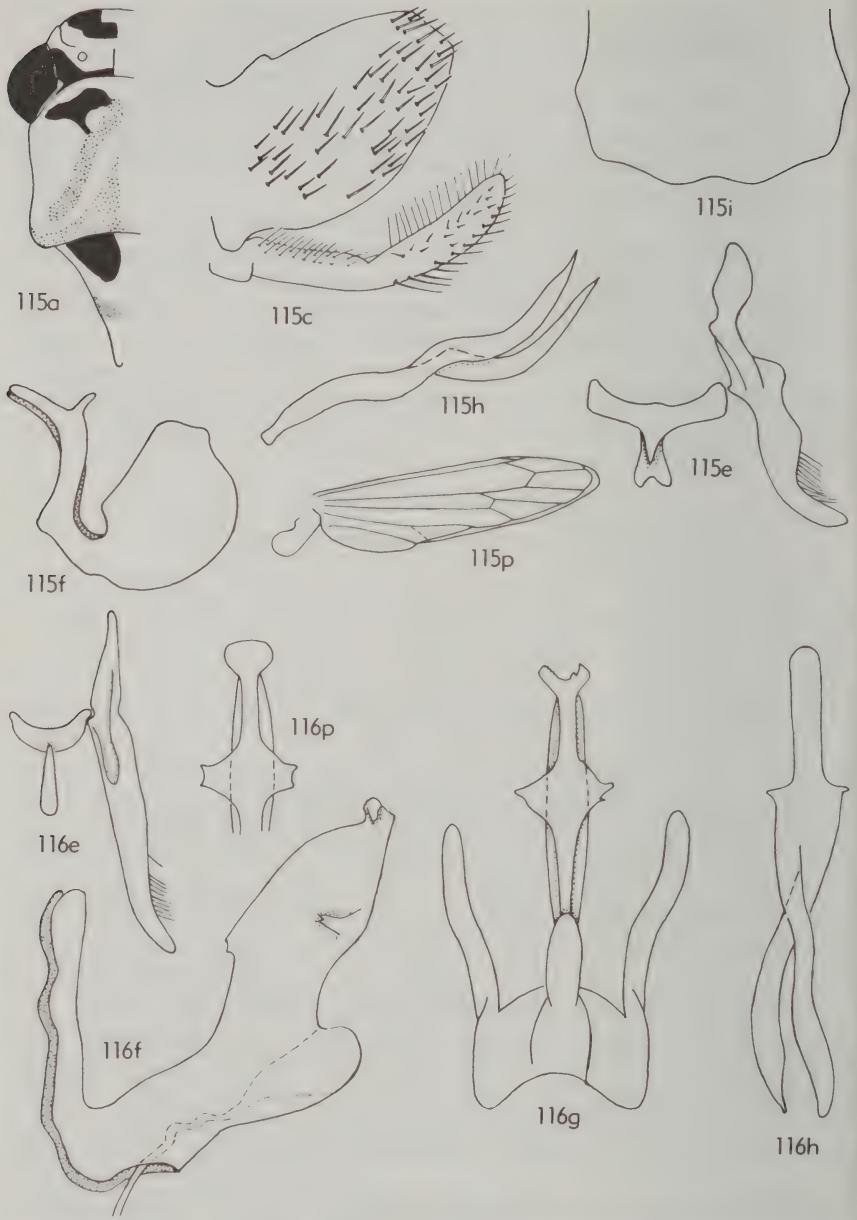
(*L. pebasensis*, n. sp., known only from the female, is not included)

1. Aedeagus with a conspicuous unpaired dorsal process arising from base of shaft (figs. 116-119) 2
   Aedeagus without such a process ..... *vespiformis* (Fabricius) (fig. 115)
2. Aedeagus with dorsal process broad, complex, in lateral view ..... *schlingeri*, n. sp.
   Aedeagus with dorsal process simple, slender, in lateral view 3
3. Pygofer in lateral view with posterior margin very broadly rounded (fig. 117*c*) ..... *pereneensis*, n. sp., page 152
   Pygofer in lateral view narrowly rounded (fig. 118*c*) 4
4. Aedeagal shaft very short, not appearing bifid apically ..... *catutara*, n. sp., page 153
   Aedeagal shaft longer, appearing bifid apically .... *nipata*, n. sp., page 153

Lissoscarta schlingeri, NEW SPECIES

FIGURE 116

Length of male 7.0-8.0 mm. Head with median length of crown from one-half to slightly less than six-tenths interocular width and from slightly less



FIGURES 115, 116.—115, *Lissoscarta vespiformis* (F.) (*i* and *p*, from specimens from French Guiana; remainder from British Guiana; *h* from lateral view). 116, *L. schlingeri*, n. sp. (*p* from specimen from Monsón Valley, Peru; remainder from topotype; *h* from dorsal view): *p*, Apex of aedeagus from caudal view.

than three-tenths to slightly more than one-third transocular width. Other external structural characters as in generic description. Male pygofer with posterior margin broadly convex, with a dorsoapical undifferentially sclerotized acute process directed mesad and crossing median line; plates extending posteriorly beyond pygofer apex, each triangular, gradually narrowed from base to apex; style extending posteriorly much beyond apex of connective which is Y-shaped with the arms widely divergent; aedeagus with a very large median dorsal process which is very broad in lateral view; aedeagus in ventral view with a pair of triangular lateral expansions, irregular in outline at their apices, at midlength of process and with its apex expanded as a simple lobe or as a pair of short divergent processes; shaft very short, rounded apically. Female unknown.

Color of crown, pronotum, and scutellum, yellow, crown with a broad interrupted subapical transverse marking, connected across the median area by a narrow arcuate more posterior marking, a triangular marking adjoining inner margin of each eye and not extending beyond inner margin of ocellus on each side, and posterior margin narrowly, black; pronotum with an elongate median triangular marking on posterior half extending laterobasally along posterior margin almost to humeral angles, and on each side a broad diagonal stripe extending anteromesally parallel to side of median marking from posterior two-thirds of disk, not attaining anterior pronotal margin, enclosing a yellow areole anteriorly, thence extending laterally and ending on each side behind eye, black; scutellum with a pair of elongate triangular markings from base to transverse sulcus and a transverse marking in posterior half, black. Forewings with a fumose area extending from apex of each humeral margin caudolaterally across clavus and becoming diffuse in corium. Face and thoracic pleura, yellow, with a longitudinal clypeal black marking on each side continuous with most anterior marking described (above) on crown, broad clypeal border of each lateral clypeal suture, transclypeal suture broadly and apical median vitta on clypellus, margins of lora and genae and a vertical marking on each gena between eye and loral suture, black. Legs yellow to brown.

Holotype male, five miles SW of "Las Palmas", Huánuco, Peru, elevation 1,000 m., October 16, 1954 (E. I. Schlinger and E. S. Ross) and one male topotype, same data; six additional male specimens, Monsón Valley, Peru, September-November, 1954 (CAS).

L. schlingeri, n. sp., differs from all of the other species in the genus in the bizarre shape of the dorsal process of the aedeagus. The species is probably most closely related to *L. pereneensis,* n. sp. (below), which it resembles externally and with which it occurs sympatrically. The males can be distinguished readily, externally, by the male plates which are abruptly narrowed in their basal halves in *pereneensis,* gradually tapered throughout their length in *schlingeri.*

This species is named in honor of one of its collectors, Dr. E. I. Schlinger.

Lissoscarta pereneensis, NEW SPECIES

FIGURE 117

Length of male 16.0-16.5 mm, of female 16.0 mm. Head with median length of crown from one-half to less than seven-tenths interocular width, and from slightly less than three-tenths to almost four-tenths transocular width. Other external structural characters as in generic description. Male pygofer as in *L. schlingeri*, n. sp. (above); plates extending posteriorly to or beyond pygofer apex, each abruptly narrowed in basal half; style not as long as in *schlingeri*, but extending posteriorly much beyond apex of connective which is as in *schlingeri;* aedeagus with a slender median dorsal process which is subacute at apex and without smaller processes; shaft much longer than in *schlingeri* and slightly expanded apically in lateral view.

Female abdominal sternum VII with a median concavity on posterior margin. Genital chamber without sclerites.

Color much as in *L. schlingeri.*

Holotype male, and two additional males, Colonia Perené, Rio Perené, 18 mi. northeast of La Merced, Junín Province, Peru, January 3, 1955 (E. I. Schlinger and E. S. Ross), six additional males, October, November and

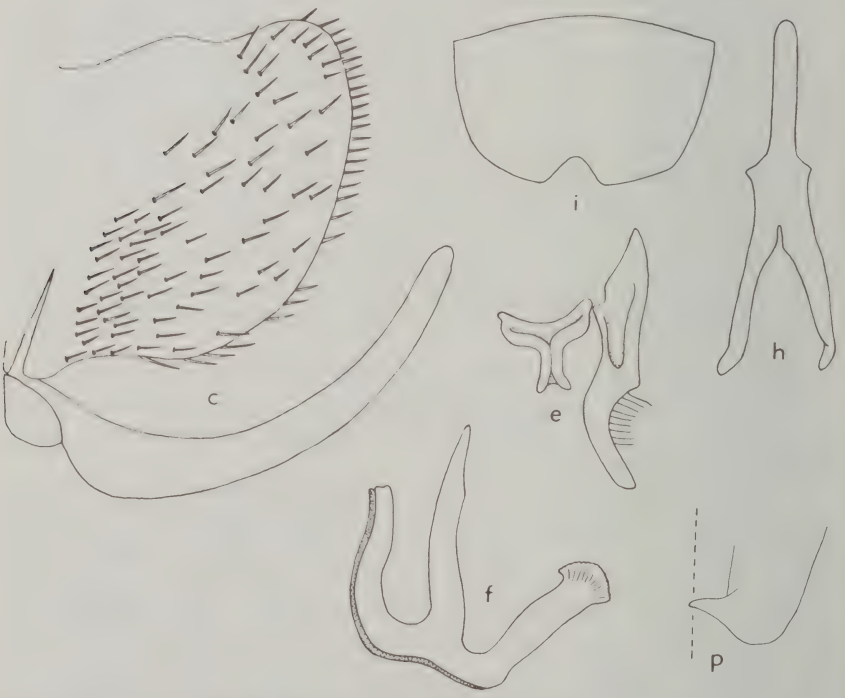


FIGURE 117.—*Lissoscarta pereneensis*, n. sp. (*i* from specimen from Ivón, Beni, Bolivia; others from Río Perené, Peru; *h* from dorsal view): *p*, Pygofer apex, right side, from dorsal view.

December, Monsón Valley, Tingo María, Peru (CAS). One male, Mapiri, Bolivia and two males, Bolivia (HNHM). One female, Beni Province, Bolivia (USNM). One male, Mapiri, Bolivia (NCS). Two males, Mapiri, Bolivia, two males, Coroico, Bolivia and two males, Songo, Bolivia (MMB). One male, Songo, Bolivia (ZIL).

L. pereneensis, n. sp., is represented in more collections than any other species in the genus. It is closely related to *schlingeri,* in the discussion of which distinguishing characters are mentioned.

Lissoscarta catutara, NEW SPECIES

FIGURE 118

Length of male 15.5 mm, of female 16.0 mm. Head with median length of crown slightly more than four-tenths interocular width and varying from slightly less than one-fourth to slightly more than one-fourth transocular width. Other external structural characters as in generic description. Male pygofer with posterior margin narrowly convex, with an undifferentially sclerotized anteapical process on dorsal margin; plates extending posteriorly approximately to apex of pygofer; style extending posteriorly much beyond apex of connective; connective very broadly T-shaped with shaft very short; aedeagus with an elongate, slender, median dorsal process which is arcuate, curving dorsally then posterodorsally in lateral view; not bearing smaller processes; shaft very short, rounded apically.

Female abdominal sternum VII with posterior margin broadly convex except for median very slightly concave emargination.

Color much as in *Lissoscarta schlingeri,* n. sp., but with the triangular markings adjoining inner margin of each eye connected by a rather broad transverse black marking across posterior margin of crown.

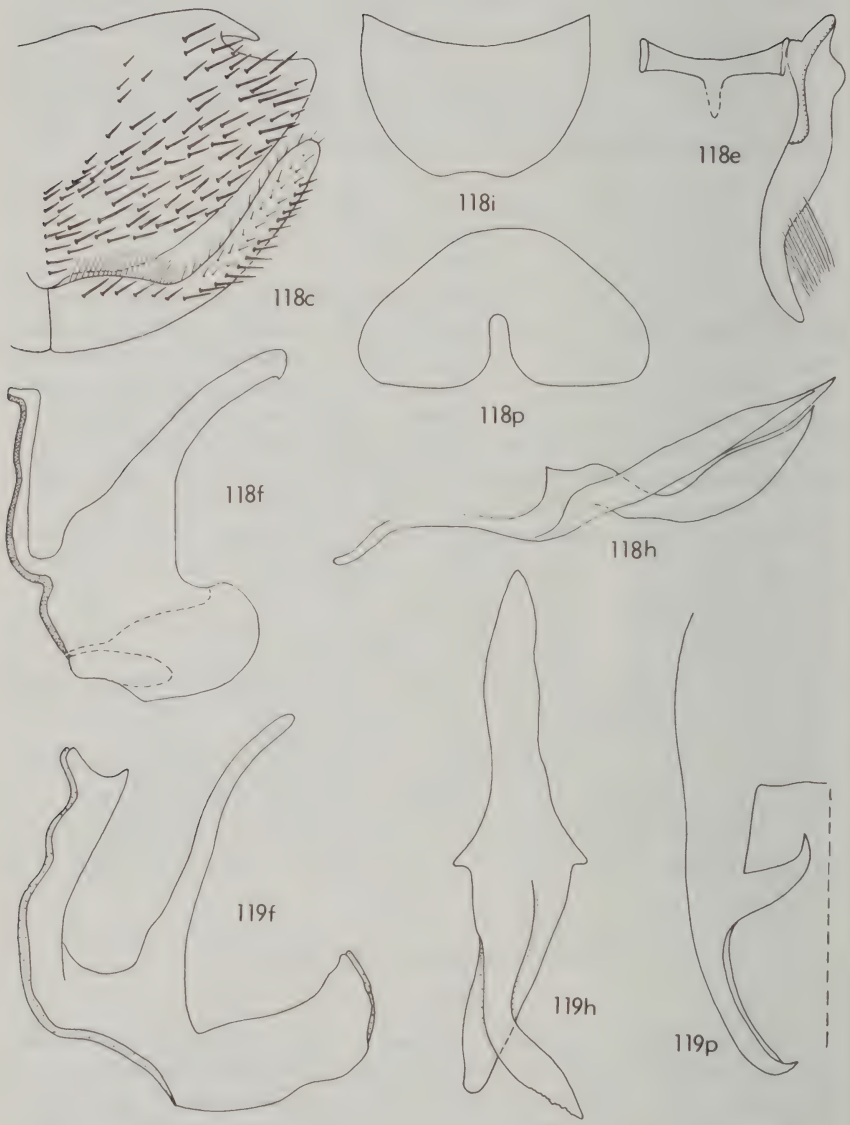
Holotype male, Rio Uaupes, Taracua, Amazonas, Brazil and one female Rio Negro, Umarituba, Brazil, Swedish Amazon Expedition (RMS).

L. catutara can be separated from all other species of the genus by the form of the aedeagus in lateral aspect and by the form of the female abdominal sternum VII.

Lissoscarta nipata, NEW SPECIES

FIGURE 119

Length of male 8.0 mm. Head with median length of crown more than one-half and less than six-tenths interocular width and approximately one-third transocular width. Other external structural characters as in generic description. Male pygofer with posterior margin narrowly rounded, subacute, with a dorsal anteapical process extending mesally then basally, not attaining median line; plates not extending posteriorly as far as pygofer apex, each triangular, abruptly narrowed in basal half; aedeagus with a slender median dorsal process, very narrow in lateral view, in ventral view without lateral expansions, shaft much longer than in *L. schlingeri,* n. sp., its apex bifid. Female unknown.



FIGURES 118, 119.—118, *Lissoscarta catutara*, n. sp. (*i*, *p*, from specimen from Rio Negro, Brazil; remainder from holotype; *h* from lateral view): *p*, Sclerite of genital chamber. 119, *L. nipata*, n. sp., holotype (*h* from dorsal view): *p*, Pygofer apex, left side, from dorsal view.

Color as in *L. schlingeri.*

Holotype male, Hacienda María, Cuzco, Peru, March 8, 1952 (F. L. Woytkowski), "along R. Cosnipata, tropical jungle, elevation 900 m.", on indefinite loan to USNM from NCS, and one male, same data, except date, March 18 (NCS).

L. nipata, n. sp., is similar to *L. catutara,* n. sp., in the anteapical dorsal pygofer process. It differs from *catutura* in the shape of the aedeagal shaft.

Lissoscarta pebasensis, NEW SPECIES

FIGURE 120

Length of female 9.5 mm. Head with median length of crown slightly more than six-tenths interocular width and less than four-tenths transocular width.

Female abdominal sternum VII with posterior margin regularly convex, genital chamber with lobes of median sclerite widely separated.

Color much as in *L. schlingeri,* n. sp.

Holotype female, "Pebas", Amazon (HNHM).

L. pebasensis differs from *L. catutara,* n. sp., in the form of the median sclerite of the genital chamber, in the form of the abdominal sternum VII, and slightly in the form of the first valvifer.

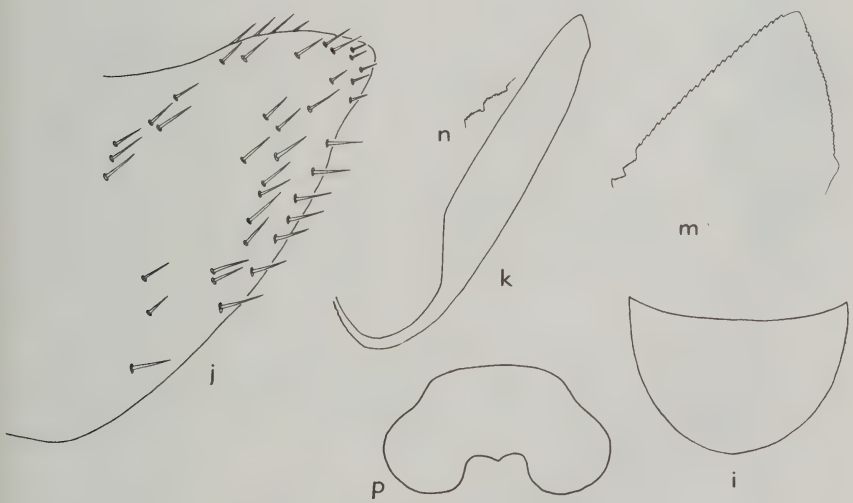


FIGURE 120.—*Lissoscarta pebasensis,* n. sp., holotype: *p,* Sclerite of genital chamber.

17. Genus MUCROMETOPIA Melichar

Figure 121

Oncometopia subgenus *Mucrometopia* Melichar, 1925a:403. Type-species: *Tettigonia caudata* Walker, by original designation.

Length of male 14.0-15.0 mm, of female 15.5 mm.

Head moderately produced, median length of crown one-half or slightly more than one-half interocular width and approximately one-third transocular width in male, approximately three-eighths transocular width in female, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each about equidistant from median line of crown and adjacent anterior eye angle, crown with a slight transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown, attaining ocelli or not; antennal ledges not protuberant, in lateral view with anterior margins obliquely convex; clypeus convex, muscle impressions distinct, transclypeal suture not entire, clypellus pubescent below, with profile continuing contour of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin shallowly

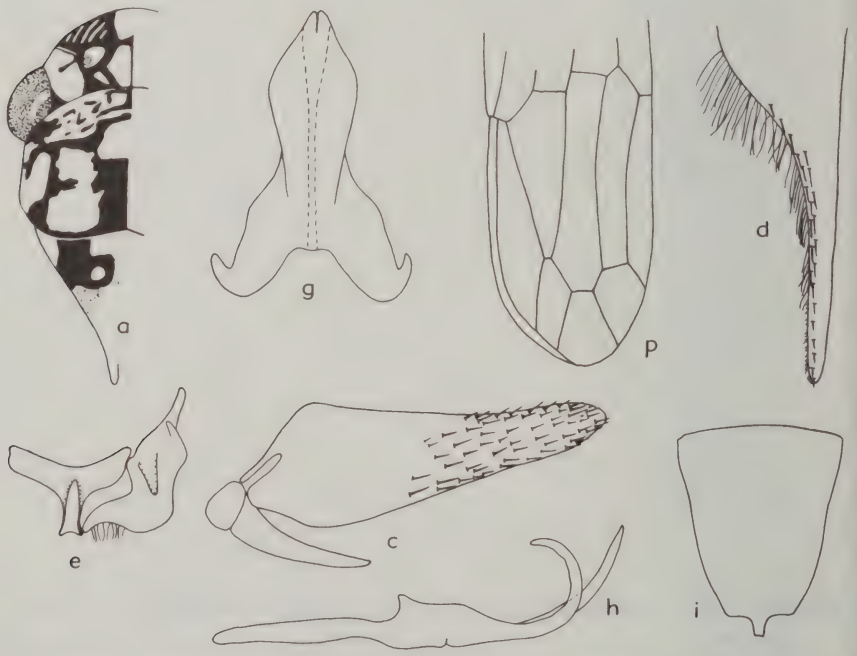


FIGURE 121.—*Mucrometopia caudata* (Walker) (*a* from specimen from Monsón Valley, Peru; *c-e, g, h,* from Chanchamayo, Peru; *i, p,* from Bogotá, Colombia; *h* from lateral view): *p,* Forewing apex.

concave, disk without sculpturing, not pubescent; scutellum not striate behind transverse sulcus. Forewing with membrane including all of apical cells and apical portions of anteapical cells, veins elevated and very distinct, with four apical cells, the base of fourth more proximal than base of third, claval veins approximate near their midlength, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with setal formula 2:1:1 or 2:1:1:1; length of first tarsomere approximately equal to combined length of second and third tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer greatly produced and narrowed, strongly convex at apex, setae numerous, located on posterior half. Plates short triangular, not extending posteriorly nearly as far as pygofer apex, with multiseriate macrosetae and also with microsetae. Style not extending posteriorly beyond apex of connective, apex directed mesad. Connective broadly Y-shaped. Aedeagus without processes. Paraphyses asymmetrical.

Female abdominal sternum VII elongate, gradually tapered almost to apex, then abruptly narrowed to median apical short truncate process. Ovipositor with second valvulae broadened in apical two-thirds, the expanded portion bearing convex primary teeth which have weak irregular secondaries, with posterodorsal and posteroventral anteapical denticles.

Specimens belonging to *Mucrometopia* Melichar have been examined from Colombia, Peru, and Bolivia.

The genus *Mucrometopia* Melichar is related to *Dilobopterus* Signoret, from which it can be readily separated by the apical cells of the forewing which are all much longer and more slender in *Dilobopterus*. The meron of the hindleg is never exposed with the forewings in rest position in *Mucrometopia*. The yellow markings of the forewing of the type-species of *Mucrometopia* are also suggestive of the group of *Dilobopterus* species near *fenestratus,* n. sp.

Melichar placed *Mucrometopia* as a subgenus of *Oncometopia* from which it varies in a great many respects. However, *M. caudata* (Walker) does have some characters suggesting a fairly close relationship to the Proconiini, e.g. the face is pubescent beneath, and the hind tibiae are not flattened as much as in most Cicadellini.

The genitalia of the holotype of *Tettigonia caudata* Walker agree well with the illustration published here. A specimen compared with the lectotype of *Oncometopia peruviensis* Distant also had genitalia like the present illustration. The synonymy has been previously published by Schröder (1962a:164).

SPECIES OF *MUCROMETOPIA*

caudata (Walker), 1851b:749 (*Tettigonia*). Colombia, Peru, Bolivia.
peruviensis (Distant), 1908b:67 (*Oncometopia*).

18. Genus TELEOGONIA Melichar

Figures 122-129

Teleogonia Melichar, 1925a:361. Type-species: *T. fusca* Walker, by original designation.
Pygometopia Schröder, 1960b:319. Type-species: *Oncometopia infuscata* Melichar, by original designation. New synonymy.

Length of male 13.0-16.5 mm, of female 16.0-20.0 mm.

Head moderately produced, median length of crown from one-half to almost seven-tenths interocular width and from slightly more than one-third to slightly less than one-half transocular width, anterior margin angularly produced or bluntly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown flattened or slightly concave across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown, usually attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus convex, occasionally slightly flattened medially, muscle impressions distinct, face pubescent ventrally, transclypeal suture not entire, clypellus with contour of lower portion continuing profile of clypeus or curved posteriorly and more nearly horizontal than profile of clypeus.

Thorax with pronotal width less than transocular width of head, pronotum usually (exceptions: *T. infuscata* (Melichar) and *T. clathrata* (Signoret)) extending posteriorly to transverse sulcus of scutellum, lateral margins parallel, dorsopleural carinae complete, posterior margin convex or concave, disk transversely rugose or not, usually with irregularly arranged gross punctures; scutellum swollen and convex but not transversely striate behind transverse sulcus. Forewing usually without a membrane, veins distinct, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and with coarse pits; forewings of female in rest position not exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or (rarely) 2:1:1:1; length of first tarsomere equal to or slightly greater than combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, posterior margin regularly convex or angulate, setae from few to many, located on posterior half. Plates triangular, not extending nearly as far posteriorly as pygofer apex, with multiseriate macrosetae and with microsetae also. Style extending posteriorly beyond apex of connective, with preapical lobe well developed or not. Connective triangular, Y-, or T-shaped without keels or with single or double longitudinal keels. Aedeagus symmetrical, without processes except for a dorsal pair of undifferentially sclerotized shaft processes near base in some species. Paraphyses symmetrical or not.

Female abdominal sternum VII with median posterior lobe varying interspecifically in shape. Dorsal membrane of genital chamber occasionally sclerotized each side of median line but sclerites poorly delimited. Ovipositor with second valvulae each broadened in apical two-thirds of portion beyond

basal curvature, with convex primary teeth on dorsal margin except denticulate anteapical portion, apicoventral margin denticulate.

Specimens belonging in the genus *Teleogonia* Melichar have been seen from French Guiana, Colombia, Venezuela, Ecuador, Peru, Bolivia (?), and Paraguay. *Telegonia* is similar to *Mucrometopia* Melichar in the form of the male pygofer, and the aedeagus and the asymmetrical paraphyses are similar to those structures in *Dilobopterus* Signoret. The shape of the second valvulae of the ovipositor is very much like some species of *Dilobopterus*. The pitted forewings, the swollen scutellum, the (usually) long pronotum, and the more

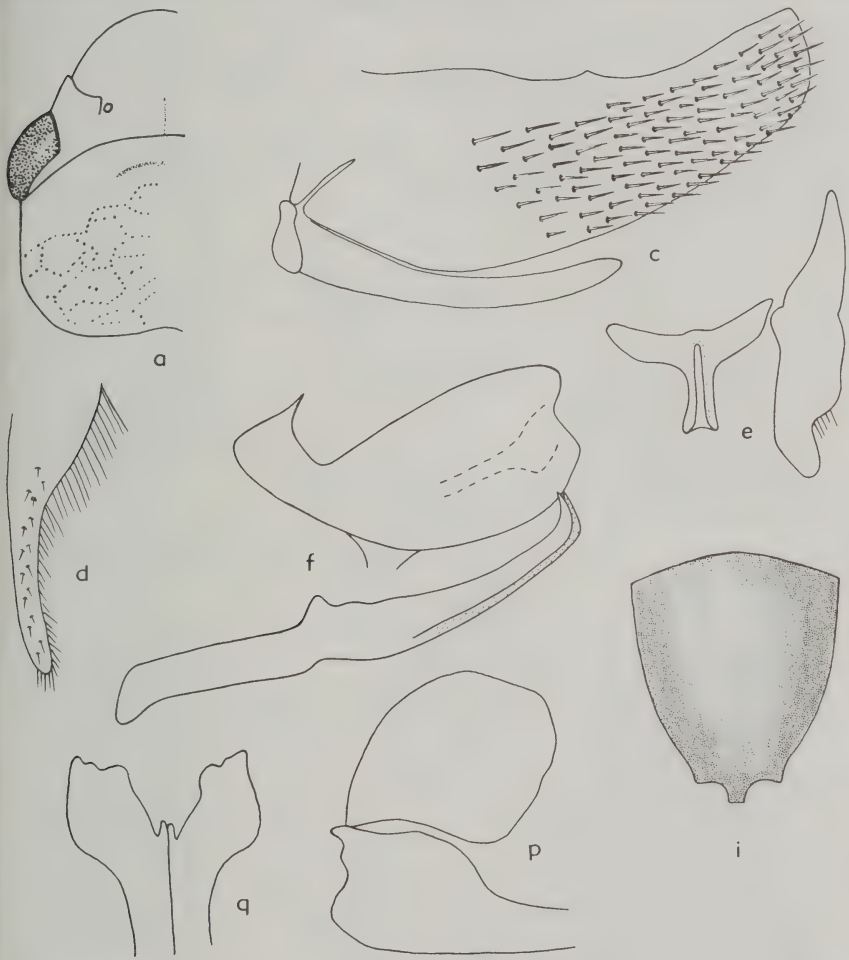


FIGURE 122.—*Teleogonia clathrata* (Signoret) (*a, e, f,* from lectotype; *c, d, p, q,* from specimens from Rancho Grande, Venezuela; *i* from Maracay, Venezuela): *f,* Aedeagus and paraphyses, from lateral view; *p,* first valvifer and base of first valvula, from lateral view; *q,* bases of first valvulae from ventral view.

restricted toothed area of the second valvulae are distinctive characters for *Teleogonia*.

The present interpretation of *Tettigonia clathrata* Signoret is based on a study of the male lectotype. *T. fusca* Walker is interpreted here in the light of a study of the holotype, a female. *Oncometopia infuscata* Melichar, as interpreted here, is based on a male lectoparatype, from the Moravian Museum, studied by Schröder. The male lectotype of *Teleogonia nigrifrons* Schmidt agrees with the present interpretation of that species.

SPECIES OF *TELEOGONIA*

arcuata, n. sp. Colombia, Peru.
clathrata (Signoret), 1855d:795 (*Tettigonia*). Venezuela. New combination.
diagonalis, n. sp. Colombia, Bolivia, (?), Paraguay (?), Venezuela (?).
epicharis, n. sp. Colombia.
fusca (Walker), 1851b:741 (*Tettigonia*). Fr. Guiana, Colombia, Paraguay.
infuscata (Melichar), 1925a:404 (*Oncometopia*). Peru. New combination.
jacobii Melichar, 1925a:362. Colombia, Ecuador.
nigrifrons Schmidt, 1928c:66. Ecuador.

KEY TO SPECIES OF *TELEOGONIA*

1. Pronotum not extending posteriorly as far as transverse sulcus of scutellum 2
   Pronotum extending posteriorly to transverse sulcus of scutellum 3

2. Length 16 mm or more ..... *clathrata* (Signoret) (fig. 122)
   Length less than 16 mm ..... *infuscata* (Melichar) (fig. 123)

3. Males (*arcuata* and *fusca* known only from female) 4
   Females (*epicharis* known only from male) 7

4. Aedeagus in lateral aspect with a dorsal expansion near base of shaft in lateral view 5
   Aedeagus without such an expansion 6

5. Clypeus broadly pale basally; pygofer rounded dorsoapically in lateral view (Colombia) ..... *epicharis*, n. sp., page 162
   Clypeus almost completely black; pygofer angulate dorsoapically in lateral view (Ecuador) ..... *nigrifrons* Schmidt (fig. 125)

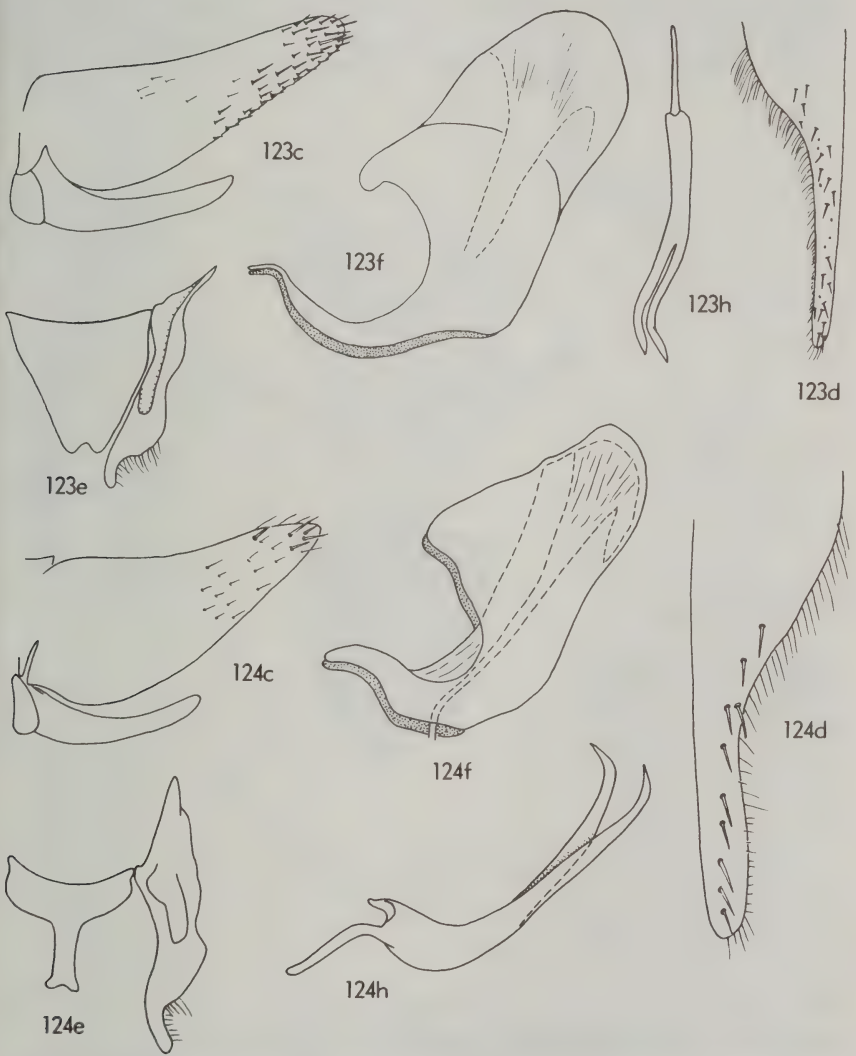
6. Forewing with apical markings consisting of a pair of diagonal castaneous stripes ..... *diagonalis*, n. sp., page 166
   Forewing with apical markings solid castaneous
   jacobii Melichar (fig. 127)

7. Bases of valvulae I of ovipositor approximate and strongly lobate in ventral view 8
   Bases of valvulae I divergent in ventral view 9

8. Bases of valvulae I broader, acute laterally, in ventral view
   fusca (Walker) (fig. 128)
   Bases of valvulae I, narrower, not angulate laterally
   arcuata, n. sp., page 164

9. Bases of valvulae I divergent at approximately an angle of 45° in ventral view 10
   Bases of valvulae I divergent at an angle of 180° in ventral view *diagonalis*, n. sp., page 166

10. Face with clypeus broadly pale dorsally ..... *jacobii* Melichar (fig. 127)
    Face with clypeus narrowly pale dorsally .... *nigrifrons* Schmidt (fig. 125)



FIGURES 123, 124.—123, *Teleogonia infuscata* (Melichar) (from specimen from Ecuador; *h* from dorsal view). 124, *T. epicharis*, n. sp., holotype (*h* from lateral view).

Teleogonia epicharis, NEW SPECIES

FIGURE 124

Length of male 16.5 mm. Head with median length of crown more than six-tenths interocular width and more than four-tenths transocular width, anterior margin approximately right-angled in dorsal view, crown concave across ocelli; lateral clypeal sutures attaining ocelli, clypeus slightly flattened medially, clypellus with contour of lower portion continuing profile of clypeus. Pronotum with posterior margin very narrowly and very slightly concave, disk without distinct transverse rugae, with irregularly arranged gross punctures; forewing without a membrane; hindleg with femoral setal formula 2:1:1,

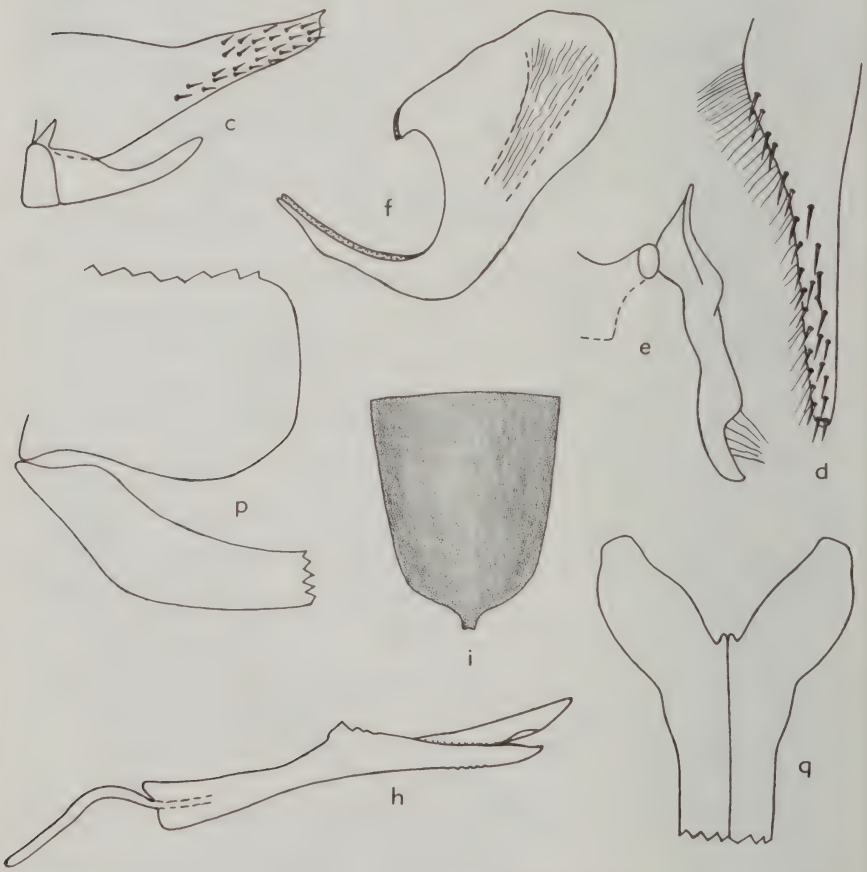
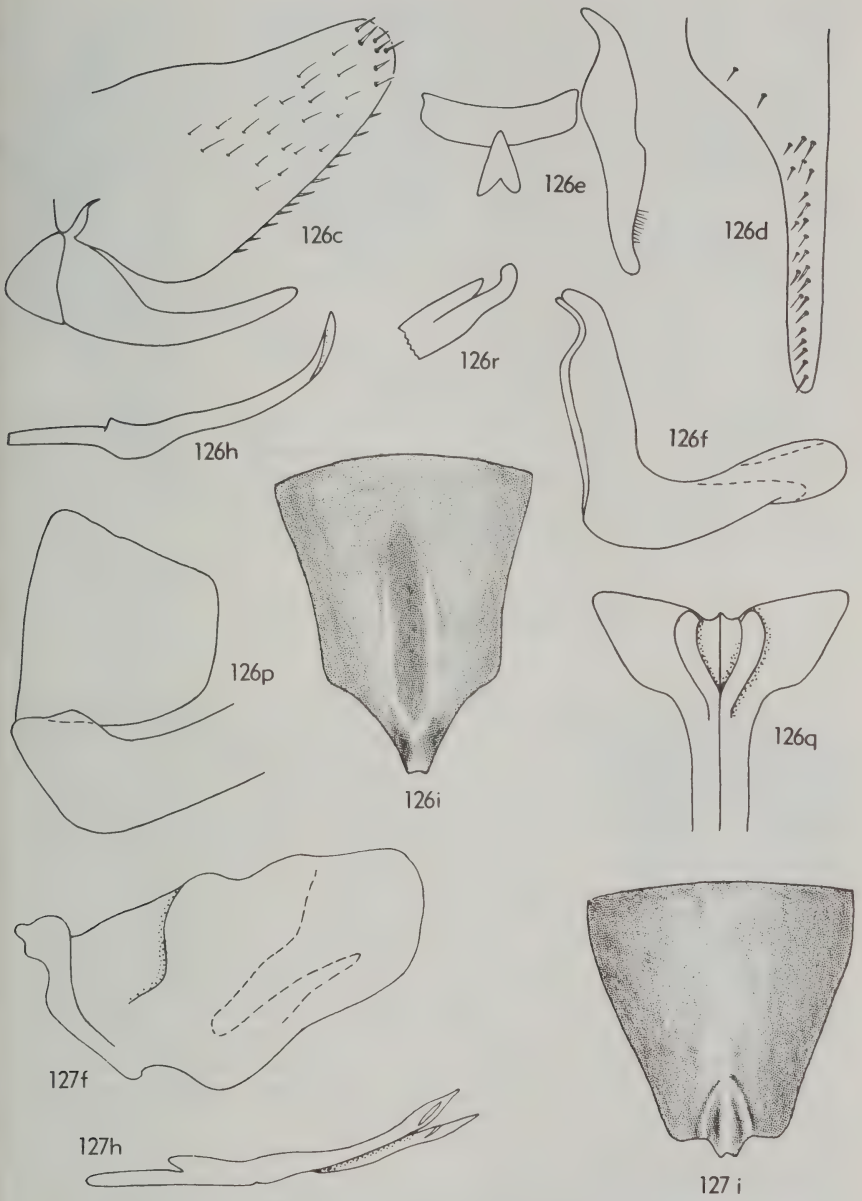


FIGURE 125.—*Teleogonia nigrifrons* Schmidt (*c-f*, and *h*, from lectotype; connective partly membranous in *e*; *i* from topotype; *h* from lateral view): *p*, First valvifer and base of first valvula, from lateral view; *q*, bases of first valvulae from ventral view.



FIGURES 126, 127.—126, *Teleogonia diagonalis,* n. sp. (*c-f, h, p,* from specimen from Alto de las Cruces [Venezuela?]; *i* from San Antonio [Venezuela?]; *h* from lateral view): *p,* First valvifer and base of first valvula, from lateral view; *q,* bases of first valvulae from ventral view; *r* apex of paraphyses from caudoventral view. 127, *T. jacobii* Melichar (from specimens from Baños, Ecuador; *h* from lateral view).

length of first tarsomere equal to combined length of two succeeding tarsomeres. Male pygofer with posterior margin regularly convex, with few macrosetae on posterior half; style with distinct preapical lobe; connective Y-shaped with arms widely divergent, keeled medially; aedeagus with dorsal margin subangularly expanded near base; paraphyses symmetrical.

Color sordid tan, except crown which is brick-red except for area of muscle impressions, and for a few tinges of red on pronotum, and scutellum which is dark red; apical third of forewing except appendix, inner apical cell and apical portion of second apical cell, fumose; face black except dorsal portion of clypeus which is brick-red medially, bordered with yellow on each side, and genae each of which bears a large brick-red area; propleura brick-red, remaining thoracic pleura and legs, yellow except apices of tibiae of first and second legs and all tarsi which are brick-red to reddish brown.

Holotype male, Bogotá, Colombia (RMS).

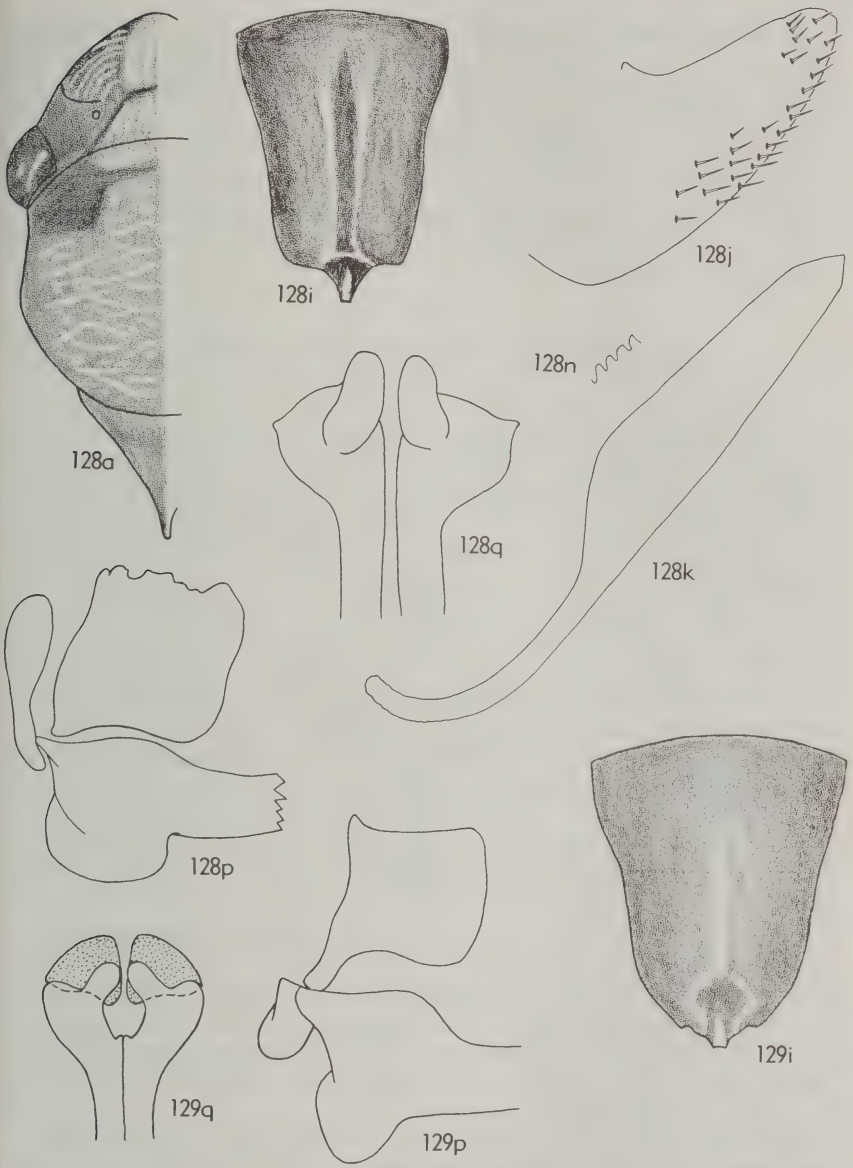
Teleogonia epicharis, n. sp., is closely related to *T. infuscata* (Melichar) and to *T. nigrifrons* Schmidt, both of which have the aedeagus strongly expanded along the dorsal margin. It differs from both of these species in its more strongly produced head, the brick-red dorsal markings, in the more angulate head and in the face being darker than in *infuscata*.

Teleogonia arcuata, NEW SPECIES

FIGURE 129

Length of female 19.0 mm. Head with median length of crown varying from one-half to almost seven-tenths (type) interocular width, and from almost four-tenths to slightly less than one-half transocular width, anterior margin slightly acutangular in dorsal view; lateral clypeal sutures not attaining ocelli. Pronotum with transverse rugae; forewing with membrane including all of apical cells and apical portions of anteapical cells; hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere equal to or slightly greater than length of two succeeding tarsomeres. Other external characters as in *T. epicharis*, n. sp. Male unknown. Female abdominal sternum VII with posterior margin rather abruptly narrowed apically, its median portion narrowly produced and truncate, disk carinate medially in anteapical portion; apical portion with a pair of arcuate carinae on each side of median portion which is also carinate at its apex. Ovipositor with bases of first valvulae parentheses-shaped in ventral view each with a median lobe bearing a lateral extension; in lateral view with lobe strongly extended ventrally, as in *T. fusca* (Walker) (fig. 128*p*), but not as broad.

Color tan, with (type) or without a fuscous diagonal vitta on each side of crown across dorsal portion of lateral clypeal suture and ocellus to base of crown, with a diagonal castaneous area across anteapical portions of anteapical cells, extending to costa, and a castaneous area in apical portion of third and fourth apical cells; face black to brown, except dorsal portion of clypeus, with a broad yellow horizontal stripe under each eye; thoracic pleura yellow, slightly marked with black; legs yellow to brown (type), tarsi black.



FIGURES 128, 129.—128, *Teleogonia fusca* (Walker) (*a* from specimen from Maroni River, French Guiana; remainder from Bogotá, Colombia): *p*, First valvifer and base of first valvula, from lateral view, showing a sclerite in genital chamber; *q*, bases of first valvulae from ventral view. 129, *T. arcuata*, n. sp. (*i* from specimen from Mocoa, Colombia; *p* and *q*, from Colombia): *p*, First valvifer, base of first valvula, and sclerite of genital chamber, from lateral view; *q*, bases of first valvulae and sclerites of genital chamber, from ventral view.

Holotype female, Colombia (Baker collection), and one female, "Huascaray", Peru, September 21, 1911 (C. H. T. Townsend) (USNM). One female, 25 miles southwest of Mocoa, Nariño, Colombia, 2080 m., March 3, 1955 (E. I. Schlinger and E. S. Ross) (CAS).

T. arcuata, n. sp., is probably most closely related to *T. fusca* (Walker) from which it differs in its much less extensive apical castaneous forewing area, its anteapical elevated area of the female abdominal sternum VII (depressed in *fusca*) and in the form of the bases of the first valvulae of the ovipositor, which are unique in the genus.

Teleogonia diagonalis, NEW SPECIES

FIGURE 126, PAGE 163

Length of male 16.0 mm, of female 17.0 mm. Head with median length of crown less than six-tenths interocular width, and from slightly less to slightly more than four-tenths transocular width, lateral clypeal sutures not attaining ocelli; clypellus with contour of lower portion continuing profile of clypeus or curving more posteriorly in apical portion. Pronotal disk with transverse rugae; hindleg with femoral setal formula 2:1:1, or 2:1:1:1, length of first tarsomere variable compared to combined length of two succeeding tarsomeres. Male pygofer with a number of microsetae and a few macrosetae on posterior half; style without distinct preapical lobe; connective short, Y-shaped, with arms widely divergent, keeled medially; aedeagus with dorsal margin of shaft not expanded near base; paraphyses asymmetrical. Other structural characters, except as follows, as in *T. epicharis,* n. sp. Female abdominal sternum VII with posterior margin gradually narrowed in apical third, apex truncate and slightly emarginate, disk narrowly depressed in middle two-thirds. Ovipositor with bases of first valvulae divergent at an angle of 180° in ventral view, their lateral margins oblique, with an arcuate slight lobe near median line on each valvula.

Color tan to sordid tan (crown and a narrow transverse anterior pronotal stripe bright yellow in one specimen), with a pair of castaneous diagonal oblique markings at apex of each forewing, bordering the area of the bases of apical cells, which is concolorous with remainder of dorsum; face black, dorsal half of clypeus, a spot under each eye and occasionally several narrow irregular spots along posterior genal margins, yellow; thoracic pleura and venter yellow to tan, legs yellow except tibial apices and tarsi of first and second legs which are black, and tibiae and tarsi of hind legs which are dark.

Holotype male and a series of topotypes of both sexes, Alto de las Cruces, "Bolivia" [error for Bolivar, Venezuela?], and two females labeled San Antonio, "Paraguay" [may be an error for Paragua, Venezuela] (MMB). Five females; San Antonio, Colombia, one female, Rio Aguacatal, Colombia, W. Cordillera, 2000 m. (Fassl) (Herbert Osborn collection, OSU). One female, 15 m. south of La Union, Nariño, Colombia, 2150 m., March 4, 1955 (E. I. Schlinger and E. S. Ross) (CAS). One male, Bogotá, Colombia (Lindig) (RMS).

T. diagonalis, n. sp., can be distinguished externally from the other species in the genus by the distinctive markings at the apex of the forewings, in the male by the narrower aedeagal shaft than in the other species of which males are known, and in the female by the bases of the first valvulae which diverge from each other at an angle of 180° at their bases.

19. WILLEIANA, NEW GENUS

FIGURES 130-133

Type-species: *Tettigoniella vallonia* Distant.

Length 6.1-12 mm.

Head slightly produced, median length varying from slightly more than four-tenths to slightly less than two-thirds interocular width and from slightly more than one-fourth to four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to median line than to adjacent anterior eye angle, surface of crown concave medially, disk without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges in lateral view with anterior margins obliquely convex; face with clypeus flat or slightly concave medially and granulate or finely punctate, muscle impressions distinct, transclypeal suture distinct or not, clypellus not swollen, in profile continuing contour of clypeus, usually with fine setae on lower portion of clypeus and genae.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae oblique, complete or not, posterior margin concave, surface without sculpturing or pubescence; posterior half of scutellum not transversely striate. Forewing with or without (*W. vallonia* (Distant)) a membrane apically, veins not very distinct except in membrane, not elevated, with four apical cells and base of fourth more proximal than base of third (wing apices damaged in only specimen of *W. maculoidea*, n. sp.), without an anteapical plexus of veins, texture coriaceous except membrane; forewings of female at rest exceeding apex of ovipositor. Hindwing not much shorter than forewing and without an enlarged jugal lobe. Hindleg with meron not exposed with wings at rest, femoral setal formula 2:1:1, first tarsomere (unknown in *maculoidea*) with length greater than combined length of second and third tarsomeres, with biseriate small macrosetae on plantar surface.

Male genitalia: Pygofer well produced and angular at apex, with numerous macrosetae on posterior half, and fewer near posteroventral margin, without processes. Plates not extending as far posteriorly as pygofer apex, narrowly triangular, separate throughout their length, abruptly narrowed near midlength, with numerous uniseriate macrosetae from near base almost to apex. Style extending posteriorly beyond apex of connective, without a preapical lobe, narrowly convex at apex. Connective elongate Y- or T-shaped. Aedeagus symmetrical, without processes, broadest in its apical half. Paraphyses present, asymmetrical, the rami shorter than the stalk, slender, tapered, acute apically.

Female unknown.

Species of *Willeiana,* new genus, occur in Peru, Bolivia, and Costa Rica. The male genitalia of species of *Willeiana* are very similar to those of some species of *Dilobopterus,* but the texture of the forewing is opaque in *Willeiana* and the hindwings are not shorter than the forewings. Also the metathoracic meron is not exposed in *Willeiana. Willeiana* is similar, in the structure of the female genitalia, to *Amblyscarta* Stål, and the new genera *Begonalia* and *Gorgonalia.* All of these lack paraphyses in the males.

There is a great deal of variation in appearance between species of *Willeiana* and within the species *W. vallonia* (Distant). The variation in the latter includes proportions of the crown as well as color pattern, and accounts for the already considerable synonymy (see list of species, below). The other species have a color pattern similar to that found in many species of *Macugonalia,* with the crown mottled and the pronotum partly or entirely mottled.

My identification of *Cicadella nigricula* Osborn is based on an examination of the holotype and a comparison of other specimens with it.

I have examined lectotypes of all the nominal species listed as synonyms of *Willeiana vallonia* (Distant) in the following list of species.

SPECIES OF *WILLEIANA*

maculoidea, n. sp. Colombia, Peru.

nigricula (Osborn), 1926b:216 (*Cicadella*). Peru, Bolivia. New combination.

vallonia (Distant), 1908a:522 (*Tettigoniella*). Peru, Bolivia, Brazil. New combination.

daeta (Distant), 1908a:522 (*Tettigoniella*). New synonymy.

ulla (Distant), 1908a:522 (*Tettigoniella*). New synonymy.

avallonia (Melichar), 1932a:308 (*Cardioscarta*). New synonymy.

rogata (Melichar), 1932a:308 (*Cardioscarta*). New synonymy.

albobifasciata (Melichar), 1932a:327 (*Cardioscarta*). New synonymy.

semiflava (Melichar), 1932a:328 (*Cardioscarta*). New synonymy.

maculicosta (Melichar), 1932a:328 (*Cardioscarta*). New synonymy.

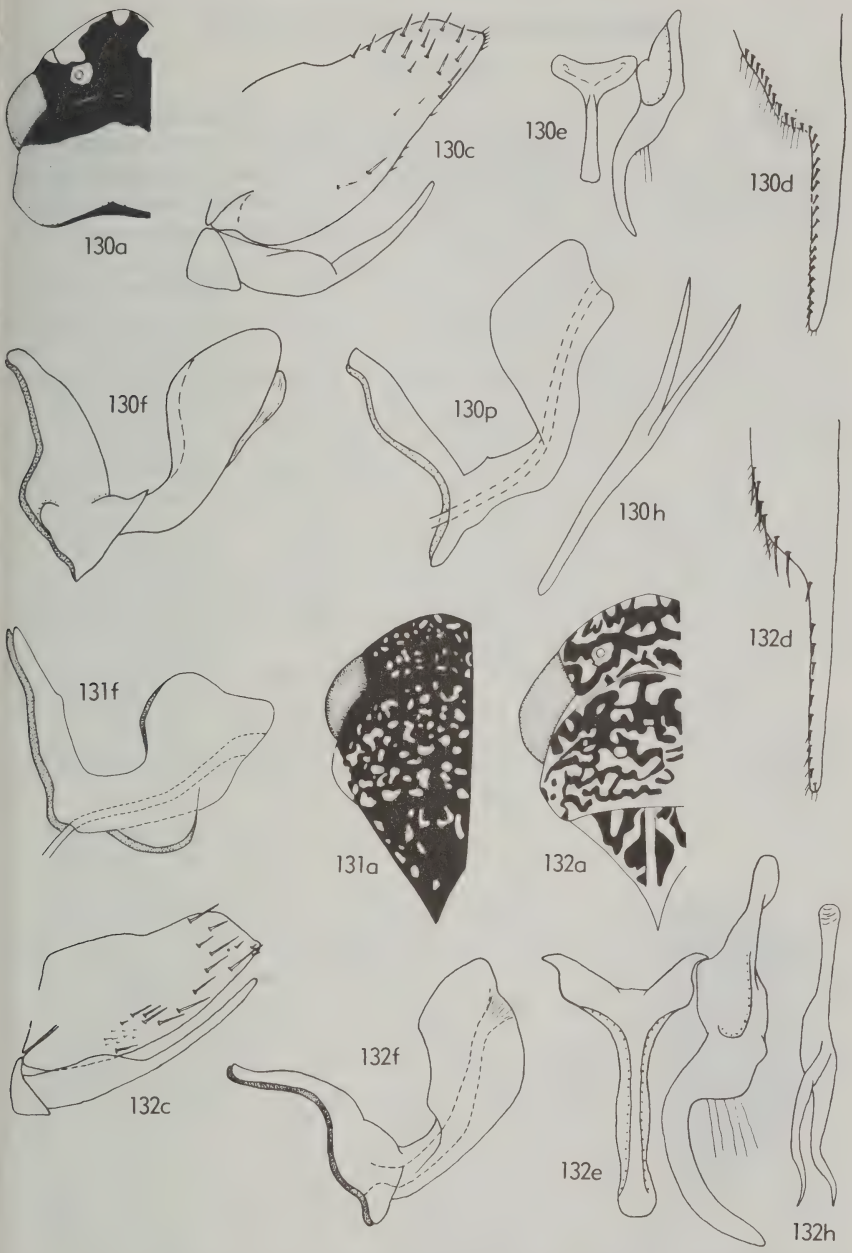
versigonoidea, n. sp. Costa Rica.

KEY TO SPECIES OF *WILLEIANA*

1. Length of male greater than 9.5 mm; crown with middle uninterrupted black ..... *vallonia* (Distant) (fig. 130)
   Length of male less than 9.0 mm; crown mottled black and yellowish, or black with small yellow spots 2

2. Forewings dark, each with three conspicuous large pale spots *nigricula* (Osborn) (fig. 131)
   Forewings without conspicuous pale spots 3

3. Pronotum entirely mottled with yellow; clypellus with a narrow median black stripe ..... *versigonoidea,* n. sp., page 170
   Pronotum with yellow markings only near its anterior margin; clypellus almost entirely black ..... *maculoidea,* n. sp., page 171



FIGURES 130-132.—130, *Willeiana vallonia* (Distant) (*p* from lectotype of *Cardioscarta albobifasciata* Melichar; remander from specimen from Petropolis, Brazil; *h* from lateral view): *p*, Aedeagus from lateral view. 131, *W. nigricula* (Osborn) (from specimen from Pozuzo, Peru). 132, *W. versigonoidea*, n. sp., holotype (*h* from dorsal view).

Willeiana versigonoidea, NEW SPECIES

FIGURE 132

Length of male 6.8 mm; female unknown. Crown with median length varying from six-tenths to slightly less than six-tenths interocular width, and slightly less than four-tenths transocular width; clypellus slightly flattened medially and finely granulate, transclypeal suture distinct; pronotum with dorsopleural carinae complete. Male with aedeagus much less strongly convex dorsally than in *W. nigricula* (Osborn) (fig. 131*f*) and not as regularly so, and with a pair of ventral lobes from atrium but none on shaft as in *nigricula*.

Crown and pronotum dark, mottled with yellow but with upper limits of muscle impressions bordered in black and with background of posterior portion of pronotum appearing darker, scutellum yellow with dark lines delimiting a median stripe and a pair of short yellow spots on anterior margin; forewings dull red or purplish with narrow longitudinal dark lines between longitudinal veins; face yellow with muscle impressions and median line of clypeus dark, the median line black near transition to crown, median line of clypellus black; thoracic pleura, venter and legs stramineous.

Holotype male, Granadilla, Costa Rica, October 25, 1934 (C. H. Ballou) on coffee; one male, San Pedro de Montes de Oca, Costa Rica, February 6, 1935 (C. H. Ballou) on *Hibiscus rosa-sinenesis* L. (USNM). One male, San José, Costa Rica, August 8, 1911 (MMB).

W. versigonoidea, n. sp., is close to *W. vallonia* (Distant) in the structure of the male genitalia, but males of *vallonia* are larger, from 10.7-12.0 mm in length, and are not mottled. The form of the aedeagus differs from *W. versigonoidea* in its less strongly convex dorsal shaft margin and in lacking the ventral convex lobes on the shaft.

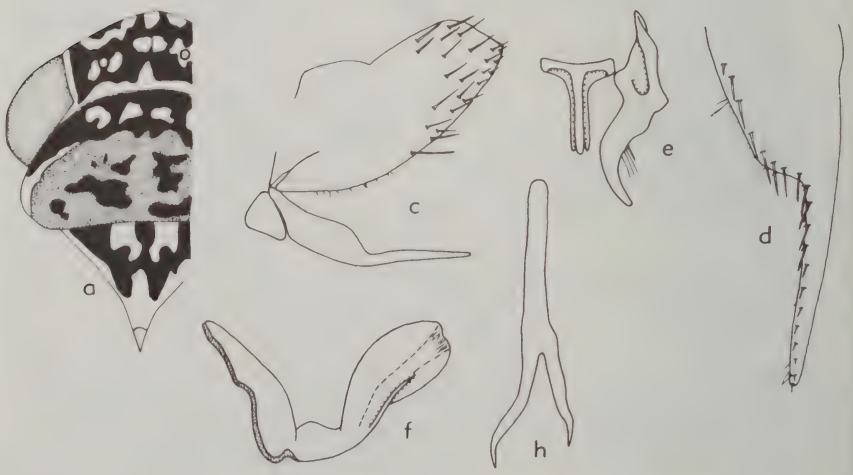


FIGURE 133.—*Willeiana maculoidea*, n. sp., holotype (*h* from lateral view).

Willeiana maculoidea, NEW SPECIES

FIGURE 133

Length of male 6.1 mm; female unknown. Crown with median length slightly more than four-tenths interocular width and slightly more than one-third transocular width; clypeus flattened medially and finely punctate, transclypeal suture obsolete, pronotum with dorsopleural carinae incomplete. Male aedeagus with a lateral keel on each side in basal two-thirds, and dorsal margin less strongly convex than in other species of the genus.

Crown and narrow anterior band of pronotum black with sparse small yellow spots and vermiculations, remainder of pronotum purple; scutellum black and yellow, the yellow areas consisting of a pair of basal spots and the edges of the lateral margins; forewings purple with indistinct narrow longitudinal black lines; face black with clypeus mottled with yellow on disk and with narrow yellow lateral margins; proepimeron mostly dull yellow; legs with femora partly black, remainder dull brown.

Holotype male, Colombia, 1941 (L. Richter), on indefinite loan to USNM from NCSU.

W. maculoidea, n. sp., differs from other species in the genus in its smaller size, in its lateral aedeagal keels, and in the less strongly convex dorsal margin of the aedeagal shaft. The markings of the head and pronotum are fewer and larger than in *W. versigonoidea,* n. sp., to which it is more similar than to the other species of the genus.

20. BEGONALIA, NEW GENUS

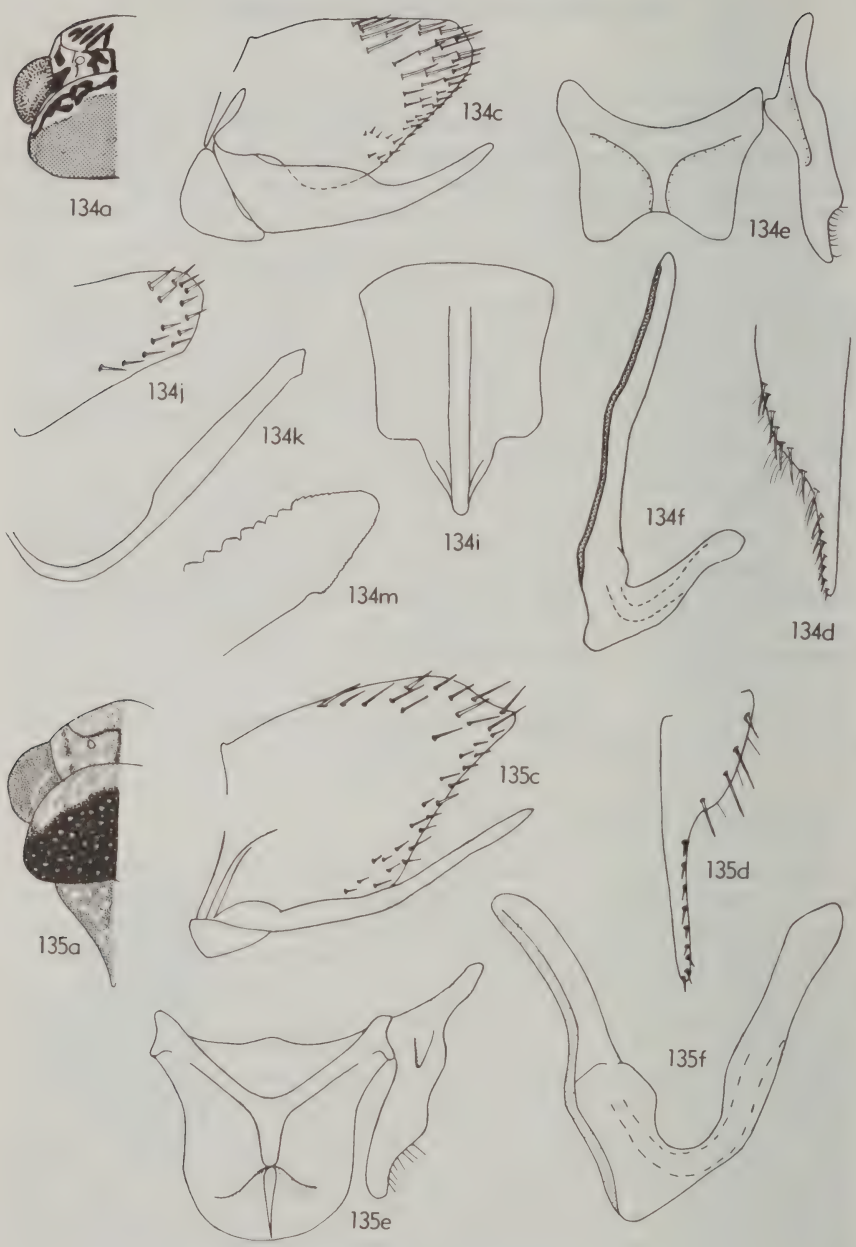
FIGURES 134, 135

Type-species: *Tettigoniella hydra* Distant.

Length 9.2-10.2 mm.

Head weakly produced, with anterior margin very broadly rounded in dorsal view, median length of crown from slightly less than one-half to slightly more than one-half interocular width and from one-fourth to less than one-third transocular width, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each ocellus approximately equidistant from median line of crown and adjacent anterior eye angle, surface with a marked transverse depression before ocelli, and a median concavity extending from it to posterior margin of head, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and slightly angulate; face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus flattened medially, disk with vertical striations, muscle impressions distinct or not, transclypeal suture obsolete at middle, clypellus not produced, contour of its lower two-thirds more nearly parallel to long axis of body than basal third which continues profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete,



FIGURES 134, 135.—134, *Begonalia hydra* (Distant) (*a*, *c-f*, from specimen from Callanga, Peru; remainder from Chanchamayo, Peru). 135, *B. nubicula* (Osborn) (from specimen from Archidona, Ecuador).

posterior margin concave, disk not transversely rugulose, not pubescent; scutellum not transversely striate behind transverse sulcus. Forewing with membrane including all of inner three apical cells and apical one-half of fourth apical cell, veins distinct, with three closed anteapical cells and four apical cells, the base of fourth located more proximally than base of third, without an anteapical plexus of veins, but often with supernumerary crossveins in middle anteapical cell. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced with apex broadly convex or angulate, with a number of macrosetae on posterior half, pygofer processes absent. Plates elongate triangular, extending posteriorly to or beyond pygofer apex, narrowed at about midlength, with uniseriate macrosetae. Style not or scarcely extending posteriorly beyond apex of connective, narrowly rounded apically, with preapical lobe. Connective broad, U-shaped or subpapilioniform. Aedeagus with dorsal apodemes elongate, shaft short, without processes. Paraphyses absent.

Female abdominal sternum VII moderately long, keeled medially, with middle of posterior margin produced and tapering to narrowly rounded apex. Genital chamber without sclerites. Ovipositor with second valvulae each broadened in less than apical two-thirds of portion beyond basal curvature, bearing primary teeth almost to apex, with minute secondaries on the primaries and with minute anteapical denticulations on dorsal and posteroventral margins, apex rounded. Pygofer with posterior margin broadly convex, macrosetae located parallel to posterior and posteroventral margins, not numerous.

Specimens of *Begonalia,* are known from northern Brazil, Ecuador, Peru, and Bolivia. Nothing is known of the biology. Females are rare in collections. I have seen only one, belonging to the type-species, collected by Juan Salazar and me, in general sweeping, in Chanchamayo, Peru. More than 150 specimens were at hand for this study.

Both species of *Begonalia,* new genus, may resemble *Macugonalia* species in the mottled head and the size, but the transverse concavity on the crown in *Begonalia,* the longer plates in the males, and the absence of aedeagal proceses will separate it readily from *Macugonalia,* new genus. It is related to *Gorgonalia,* new genus, but the relatively short head and deeper concavity of the crown of *Begonalia* are distinctive.

My interpretation of *Tettigoniella hydra* Distant is based on the lectotype. I have seen four males, from OSU from the type-series of *Cicadella inscriptula* Osborn. I select one of these as lectotype. It bears labels: "Chulumani/ Bolivia/Dec. 9, '98" and "9017♂", and "Holotype/Cicadella/inscriptula/ Osborn" and "Herbert Osborn/Collection" and Osborn's handwritten determination label, and the lectotype label. The genitalia agree with the figures published here (fig. 134, *c-f*).

I have determined *Cicadella nubicula* Osborn in the sense of two specimens bearing this label and attributed to Breddin. Osborn stated in his original description that he had such specimens at hand. The Breddin name was a *nomen nudum,* and never appeared in a publication by Breddin.

SPECIES OF *BEGONALIA*

hydra (Distant), 1908a:520 (*Tettigoniella*). N. Brazil, Ecuador, Peru, Bolivia. New combination.

inscriptula (Osborn), 1926b:213 (*Cicadella*). New synonymy.

nubicula (Osborn), 1926b:184 (*Cicadella*). Ecuador, Peru. New combination.

KEY TO SPECIES OF *BEGONALIA*

Aedeagal shaft shorter (fig. 134*f*); style extending at least as far posteriorly as connective ..... *hydra* (Distant) (fig. 134)

Aedeagal shaft longer (fig. 135*f*); style not extending posteriorly as far as end of connective ..... *nubicula* (Osborn) (fig. 135)

21. GORGONALIA, NEW GENUS

FIGURE 136

Type-species: *Tettigonia sirena* Stål.

Length 8.0-9.1 mm.

Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than six-tenths to slightly less than two-thirds interocular width and from one-third to four-tenths transocular width, without a carina at transition from crown to face, ocelli located on or almost on a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, crown very shallowly concave before ocelli, without a median fovea, surface of crown without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with their anterior margins oblique and slightly convex; clypeus convex, muscle impressions distinct, clypellus with contour continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae usually complete, posterior margin shallowly concave, disk transversely rugose, not pubescent; scutellum not rugose behind transverse sulcus. Forewing with membrane including at least inner three apical cells, veins distinct in color except crossveins in some specimens, with three anteapical cells of which the base of innermost is opposite claval apex and bases of two outermost are more proximal; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere equal to, or greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer not strongly produced posteriorly, narrowly rounded posterodorsally, with few macrosetae of varied sizes in irregular pattern on apical half; pygofer processes absent. Plates, triangular, slender, tapering gradually, extending posteriorly as far as or farther than pygofer apex, each with uniseriate macrosetae. Style extending posteriorly farther than apex of connective. Aedeagus with shaft extending posterodorsally, in lateral view

with a slight dorsal convexity near its base, without processes. Paraphyses absent.

Female abdominal sternum VII very strongly produced and tapered posteriorly; second valvulae of ovipositor broad, each with ventral margin rectilinear, bearing teeth on dorsal margin on apical four-fifths beyond basal curvature, the primaries very broad near base and becoming progressively

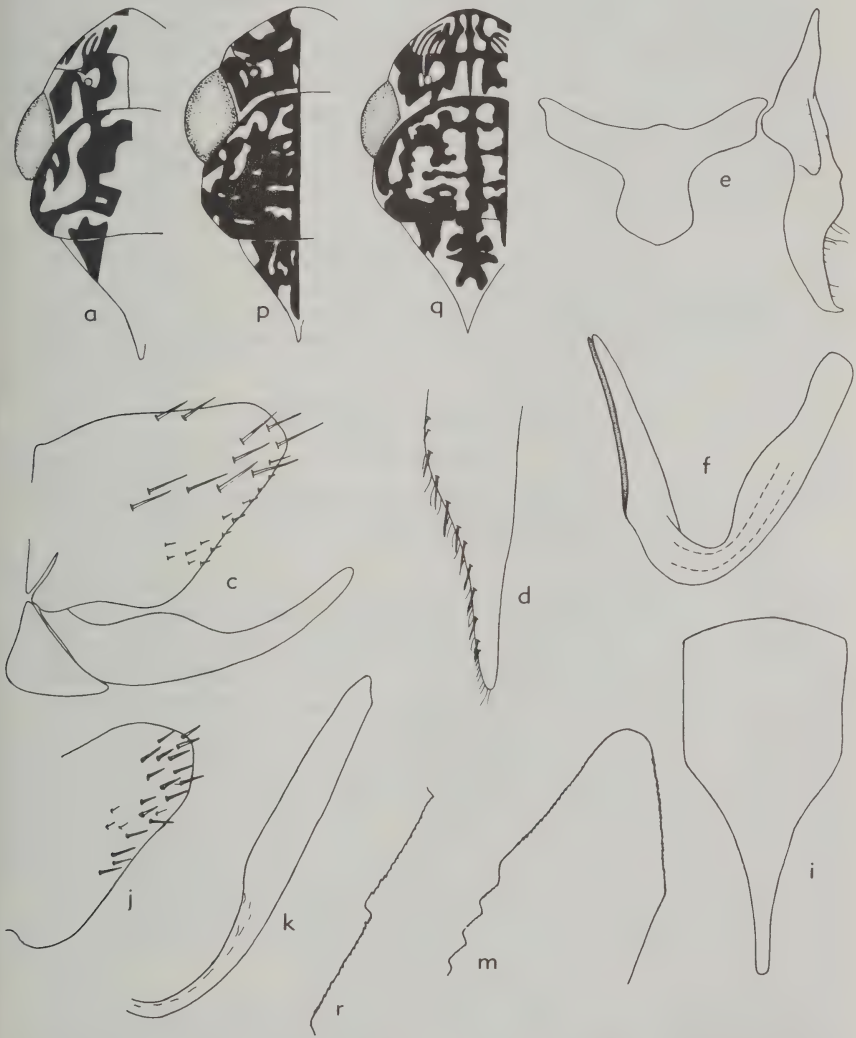


FIGURE 136.—*Gorgonalia sirena* (Stål) (*a, i, p,* from specimens from Mexico, *i* from lectotype; *c-f,* from Guatemala; *q* from Puebla, Mexico; *j-m, r,* from Tamazunchale, Mexico): *p, q,* Anterior dorsum; *r,* teeth near base of toothed portion of second valvula.

smaller towards apex of valvula, each with secondary teeth; with posterodorsal and posteroventral anteapical denticles.

Gorgonalia, new genus, is known only from Mexico and Guatemala. The form of both male and female genitalia suggest a possible relationship to *Begonalia,* new genus. There is a considerable amount of variation in color, both in the arrangement of the dark markings of the crown, and in the markings of the forewings, but in the short series of specimens available, I have been unable to associate these with morphological differences.

My identification of *Tettigonia sirena* Stål is based on a study of the lectotype female and specimens later associated with my illustrations of it. The basis of my interpretation of *Tettigonia conspissata* Fowler is a female topotype, compared with the lectotype of that nominal species.

I place *Tettigonia tessellata* Signoret in *Gorgonalia* because of the similarity between Signoret's original illustration to *G. sirena* Stål. This disposition warrants further study.

SPECIES OF *GORGONALIA*

sirena (Stål), 1864a:76 (*Tettigonia*). Mexico. New combination.
conspissata (Fowler), 1899d:241 (*Tettigonia*). New synonymy.
tessellata (Signoret), 1855d:790 (*Tettigonia*). Mexico. New combination.

22. Genus AMBLYSCARTA Stål

FIGURES 137-158

Tettigonia (*Amblyscarta*) Stål, 1869a:71. Type-species: *Tettigonia modesta* Fabricius, by subsequent designation of Kirkaldy, 1907d:89.

Length 9.6-15.4 mm.

Head usually only slightly produced, median length of crown from one-fifth to slightly more than one-half interocular width and from slightly less than one-fifth to slightly more than one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line, crown convex, with a slight transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli (exception: *grammaca,* n. sp.); antennal ledges usually not protuberant, in lateral view with anterior margins rectilinear and vertical or slightly oblique, ledges not carinate dorsally; clypeus convex or slightly flattened, muscle impressions distinct, face without pubescence, transclypeal suture almost always entire, clypellus not strongly produced but in profile with lower portion abruptly curved posteriorly.

Thorax with pronotal width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin convex or concave, disk with or without punctures or rugosity, not pubescent; scutellum usually not striate behind transverse sulcus. Forewing with or without a membrane, veins distinct, often elevated, with four apical cells, the base of fourth usually more proximal than base of

third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere variable compared with combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer varying from short to moderately produced, posterior margin convex and often with a slight concavity in its dorsal portion, setae from few to many, mostly on posterior half, often mixed macro- and microsetae. Plates elongate triangular, extending posteriorly to varying degree compared with pygofer apex, with uni- or multiseriate macrosetae and usually with microsetae also. Style extending much farther posteriorly than apex of connective, usually without preapical lobe. Connective in form of transverse bar. Aedeagus symmetrical, usually expanded apically in caudoventral view. Paraphyses absent.

Female abdominal sternum VII with median posterior lobe which is usually rounded apically, acute in some species. Dorsal membrane of genital chamber often with a conical evagination near base of first valvifer, the structure heavily sclerotized and visible externally in some species. Ovipositor with second valvulae each narrow in basal portion, apical one-half to two-thirds expanded and with large dorsal quadrate primary teeth not extending quite to rounded apex, apicoventral margin with very fine denticulations. Pygofer with very few macrosetae located parallel to apical and to posteroventral margin.

Specimens belonging to *Amblyscarta* Stål occur from Mexico to southeastern Brazil and northern Argentina, and to Bolivia. *Amblyscarta* is related to the new genera *Willeiana, Begonalia,* and *Gorgonalia.* It differs from *Willeiana* in its lack of paraphyses in the male genitalia, and it may be separated readily from the other genera by its more robust form, and the form of the connective in the male.

The male genitalia of the lectotype of *Cicada aurulenta* Fabricius agree with the illustration published here. *A. purpurata* (Germar) is placed in synonymy through association of Signoret's (1853b: plate 8, fig. 2) illustration with specimens determined as *A. aurulenta* by the present writer.

The species Metcalf (1949b:269) identified as *purpurata* is actually *Amblyscarta bicincta* (Germar). Signoret (1853b:239) is followed here, as first reviser, in identifying the latter with *A. bifasciata* (Fabricius), and the present association of the Germar name with the genitalia illustrated here rests on that plus a comparison of the genitalia of the male lectotype of *Cicada bifasciata* Fabricius with the present illustration.

The anterior dorsum of the lectotype of *Tettigoniella cervicula* Jacobi is like the present illustration; the aedeagus is like that of *A. bicincta* (Germar) (figs. 155*a* and 152*f*); the other genital characters as in the present illustrations of *A. binotata,* n. sp. (figs. 154*c-g*).

Metcalf (1955a:264) is followed here in the generic placement of *Amblyscarta frontaliana* Metcalf. A female in the British Museum determined as (*A. frontalis* (Germar)) = *frontaliana* Metcalf is correctly placed in *Amblyscarta,* as are two females (MMB) and two specimens without abdomens (ZIMH). I have seen no other specimens.

Tettigoniella inca Distant of which the male lectotype has genitalia like the present illustration, has been compared with the female lectotype of *T. rosenbergi* Distant.

A female specimen from DEI is here designated lectotype of *Tettigonia incula* Breddin. It bears labels: "Napo/(Ecuad.)/ R. Haensch S." and "Type" and "Tettigonia/incula/n. spec." and "Coll. Breddin" and "Tettigoniella/incula/ Bredd./♀ Edm. Schmidt/determ. 1910" and the lectotype label. *A. incula* (Breddin) is the commonest color of the female of *A. opulenta* (Walker). Most males are colored as in typical *opulenta,* but a male in USNM, colored like most of the females, has genitalia identical to typically colored males of *opulenta.* A male, compared with the female holotype of *Tettigonia opulenta* Walker has genitalia like the present illustration. *Tettigonia resecta* Signoret, a nominal species of which the type is unknown to the writer, is placed in synonymy on the basis of Signoret's (1853b: pl. 8, fig. 5) original illustration.

No specimens of *Amblyscarta lignea* (Fowler) have been seen. The species is placed in the genus on the basis of the original illustration.

The teneral female lectotype of the type-species, *Cicada modesta* Fabricius, the only specimen seen by the writer, is undoubtedly congeneric with the other species here included in the genus.

The present interpretation of *Cicada pulchra* Fabricius is based on similarity of the anterior dorsum of the female lectotype with the specimen illustrated here.

Amblyscarta ruficeps (Walker) and *A. resolubilis* (Fowler) are very closely related, differing chiefly in markings of face and form of the female abdominal sternum VII (only one female of *resolubilis* was at hand).

Tettigonia schaumi Signoret is known only from the female lectotype.

T. stillifera Stål is known only from the female lectotype. It is close to *A. invenusta,* n. sp. in size and facies, but differs in the shape of the posterior margin of the abdominal VII, in that it lacks an apical black spot on the crown (present in all specimens of *invenusta* at hand), and in lacking the subhyaline anteapical area of the forewings.

The female lectotype of *Tettigonia melancholica* Fowler has the abdominal sternum VII like the present illustration of *A. cervicula* (Jacobi). The color of the wings is similar to that of *A. invenusta,* n. sp. I have seen an additional male, too late to include an illustration here, but the characters in the following key should suffice for identification purposes.

The present interpretation of *A. venosa* (Signoret) rests on a pair of specimens in the Signoret collection in Vienna, both of which are from Colombia. The type locality is Bolivia. No additional specimens have been seen, and the species is without a type-specimen.

SPECIES OF *AMBLYSCARTA*

(*Type not seen; **known only from female lectotype)

alternata, n. sp. N. Brazil.

aurulenta (Fabricus), 1787a:269 (*Cicada*). Colombia, Bolivia, NE. and SE. Brazil.

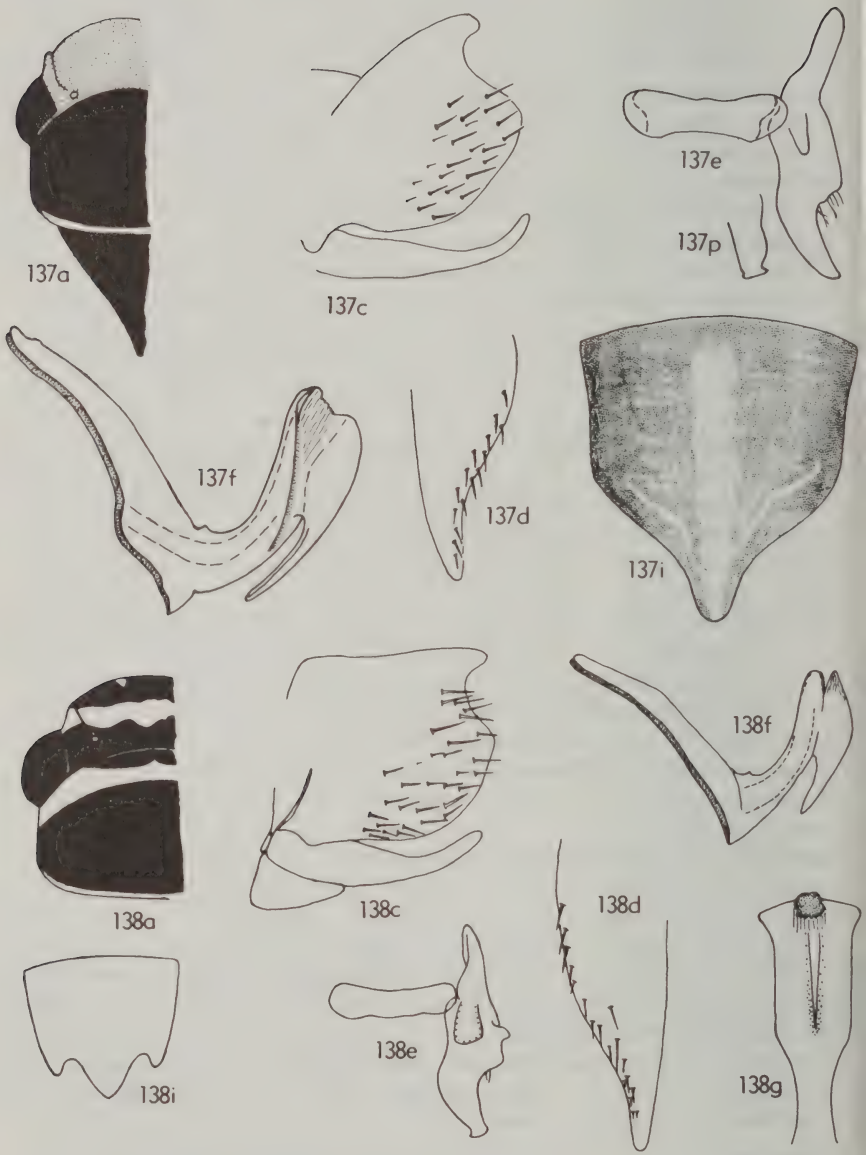
**purpurata* (Germar), 1821a:63. (*Tettigonia*). New synonymy.

bicincta (Germar), 1821a:66 (*Tettigonia*). Fr. and Br. Guiana.
bifasciata (Fabricius), 1803a:70 (*Cicada*) (preoccupied).
binotata, n. sp. Colombia, NW. Brazil, Peru.
cervicula (Jacobi), 1905c:172 (*Tettigoniella*). Bolivia.
digitata, n. sp. Venezuela.
frontaliana Metcalf, 1955a:264 (new name).
frontalis (Germar), 1821a:64 (*Tettigonia*) (preoccupied).
grammaca, n. sp. Brazil.
inca (Distant), 1908a:517 (*Tettigoniella*). Ecuador.
rosenbergi (Distant), 1908a:518 (*Tettigoniella*). New synonymy.
incommoda, n. sp. W. Brazil.
incorrupta (Melichar), 1926a:339 (*Sphaeropogonia*). Colombia. New combination.
invenusta, n. sp. Br. and Fr. Guiana, Colombia, N. and E. Brazil, Paraguay, Argentina.
lignea (Fowler), 1899c:239 (*Tettigonia*). [Mexico, Guatemala]. New combination.
melancholica (Fowler), 1899c:240 (*Tettigonia*). Panama. New combination.
****modesta*** (Fabricius), 1803a:70 (*Cicada*). [South America].
obscura, n. sp. NW. Brazil, Peru.
opulenta (Walker), 1851b:747 (*Tettigonia*). Venezuela, Colombia, Ecuador, Peru.
incula (Breddin), 1901f:101 (*Tettigonia*). New synonymy.
resecta (Signoret), 1853b:327 (*Tettigonia*). New synonymy.
pulchra (Fabricius), 1803a:69 (*Cicada*). Fr. and Br. Guiana, NE. Brazil.
resolubilis (Fowler), 1899c:236 (*Tettigonia*). Mexico, Guatemala, Costa Rica, Panama, Colombia.
ruficeps (Walker), 1858b:196 (*Tettigonia*). Mexico, Br. Honduras, Guatemala, Costa Rica, Panama.
var. *trilineata* (Fowler), 1899c:236 (*Tettigonia ruficeps*).
var. *deficiens* (Fowler), 1899c:236 (*Tettigonia ruficeps*).
****schaumi*** (Signoret), 1853b:327 (*Tettigonia*). Brazil.
****stillifera*** (Stål), 1862e:39 (*Tettigonia*). SE. Brazil.
trinotata, n. sp. Peru.
venata, n. sp. Bolivia.
venosa (Signoret), 1853b:334 (*Tettigonia*). Colombia.

KEY TO MALES OF *AMBLYSCARTA*

(The following species are not included: *cervicula* (Jacobi) (fig. 155), *frontaliana* Metcalf, *modesta* (Fabricius) (fig. 156), *schaumi* (Signoret) (fig. 157), *stillifera* (Stål) (fig. 158), *lignea* (Fowler)).

1. Aedeagus in lateral view with an unpaired ventral recurved process at apex 2
   Aedeagus without such a process 3
2. Face red ..... *ruficeps* (Walker) (fig. 137)
   Face black with ivory markings ..... *resolubilis* (Fowler) (fig. 138)
3. Posterior pygofer margin irregularly emarginate in dorsal view *opulenta* (Walker) (fig. 139)
   Posterior pygofer margin not as above 4



FIGURES 137, 138.—137, *Amblyscarta ruficeps* (Walker) (*i* from specimen from Panama; remainder from Costa Rica): *p*, Style apex from lateral view. 138, *A. resolubilis* (Fowler) (*g* from specimen from Vera Cruz, Mexico; *i* from Gamboa, Panama; remainder from Panama).

4. Dorsum orange with three dark transverse stripes on forewings *alternata,* n. sp., page 186
   Dorsum not so colored 5
5. Aedeagus in lateral view with apex extending dorsally much beyond gonopore and narrow and arched posteriorly (fig. 145*f*, 146*f*) 6
   Aedeagus not extending dorsally much, or at all, beyond gonopore 7
6. Aedeagus in lateral view with a slender basiventral tapering shaft process extending almost to apex of shaft ..... *grammaca,* n. sp., page 183
   Aedeagus in lateral view without such a process, with paired lateral flanges on shaft ..... *invenusta,* n. sp., page 184

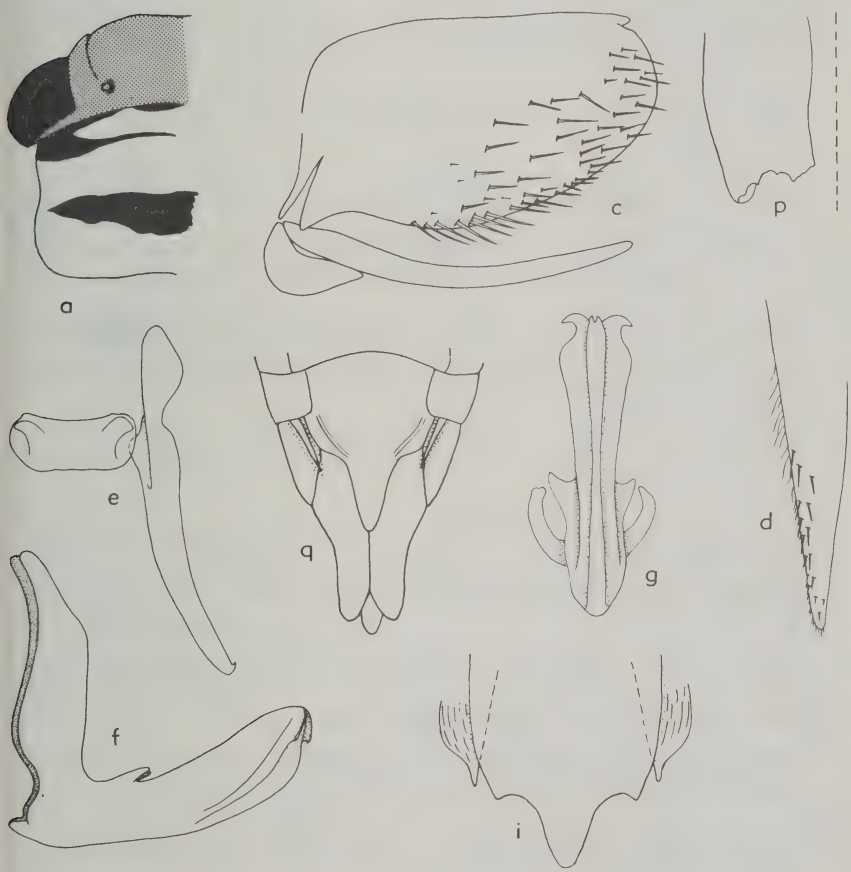


FIGURE 139.—*Amblyscarta opulenta* (Walker) (*i* from specimen from Tingo María, Peru; remainder from specimens from Colombia; *i* from macerated specimen): *p,* Male pygofer, left side, from dorsal view; *q,* apex of abdomen of female, specimen not macerated.

7. Aedeagus in lateral view with a pronounced narrowly convex anteriorly directed lobe on each side of atrium (fig. 141*f*)
incommoda, n. sp., page 195
Aedeagus in lateral view rectilinear, undulate, concave, or broadly and regularly convex, without such a lobe 8

8. Aedeagus in lateral aspect very slender, apex deeply bifid, Y-shaped with slender arms in caudoventral view ..... *pulchra* (Fabricius) (fig. 142)
Aedeagus in lateral aspect not as above, broader, apex bilobate with lobes scarcely separated, or with processes that do not resemble arms of "Y" in caudoventral aspect, or convex at apex 9

9. Aedeagus in lateral view with a pair of conspicuous recurved apicoventral processes ..... *incorrupta* (Melichar) (fig. 143)
Aedeagus not so 10

10. Pygofer with an anteapical dorsal digitate process
digitata, n. sp., page 193
Pygofer without such a process (dorsal margin with an apical lobe in some species) 11

11. Head with crown unicolorous, unmarked 12
Head with at least a round black spot at apex of crown 15

12. Forewing fuscous with conspicuous pale transverse markings; aedeagal shaft at apex acutangularly emarginate medially in caudoventral view *inca* (Distant) (fig. 147)
Forewing with transverse markings otherwise, if present; aedeagal shaft at apex more broadly angularly emarginate medially in caudoventral view (figs. 148*g* and 149*g*) 13

13. Aedeagus with a pair of proximally-directed processes on each side at apex ..... *melancholica* (Fowler)
Aedeagus not as above 14

14. Aedeagal shaft in lateral view broad at base, with paired short dorsal processes near base ..... *trinotata,* n. sp., page 191
Aedeagal shaft in lateral view much narrower at base, without processes except at apex ..... *venosa* (Signoret) (fig. 149)

15. Forewing opaque white with transverse markings and longitudinal veins dark ..... *venata,* n. sp., page 194
Forewing dark; transverse markings dark, pale, or wanting 16

16. Aedeagus in lateral view with shaft at midlength separated from dorsal apodeme by a distance less than width of shaft at this point
aurulenta (Fabricius) (fig. 151)
Aedeagus with shaft at midlength much more widely separated from dorsal apodeme 17

17. Aedeagus in lateral view without dorsal processes at base of shaft which is convex at apex in caudoventral view ..... *bicincta* (Germar) (fig. 152)
Aedeagus in lateral view with short paired dorsal processes at base of shaft which is concave at apex in caudoventral view 18

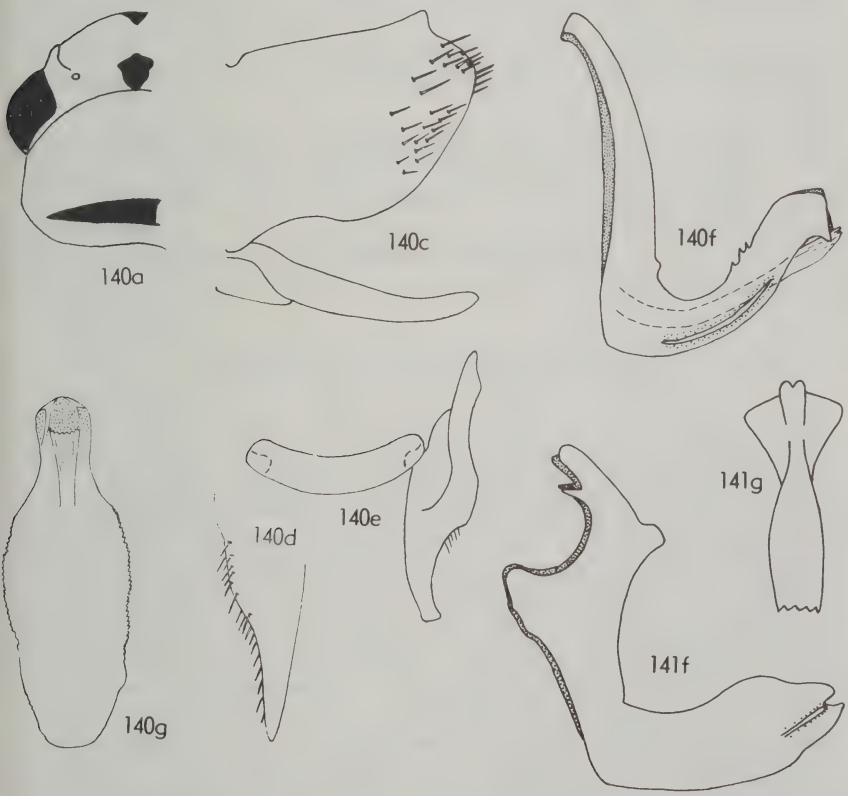
18. Larger and more robust, length 11.8-13.3 mm; aedeagus abruptly broadened beyond apical one-fifth in caudoventral view
obscura, n. sp., page 189

Smaller and more slender, length 9.7-10.0 mm; aedeagus gradually broadened at base of apical third in caudoventral view
binotata, n. sp., page 190

Amblyscarta grammaca, NEW SPECIES

FIGURE 145, PAGE 188

Length 9.7-10.7 mm. Head slightly produced, median length of crown varying from one-third to slightly less than four-tenths interocular width, and from slightly less than one-fourth to one-fourth transocular width, antennal ledges not protuberant, clypeus strongly convex. Pronotum with lateral margins



FIGURES 140, 141.—140, *Amblyscarta alternata,* n. sp. (from specimen from Rio Autaz, Upper Amazon; only aedeagal shaft shown in *g*). 141, *A. incommoda,* n. sp., holotype (only apex of shaft shown in *g*).

parallel, posterior margin rectilinear or slightly convex, disk without sculpturing, scutellum not striate behind transverse sulcus. Forewing with membrane subhyaline, veins elevated, distinct. Hindleg with femoral setal formula 2:1:1; length of first tarsomere approximately equal to combined length of two more distal tarsomeres.

Male pygofer moderately produced, posterior margin narrowly rounded posterodorsally and with an apical process extending mesad, almost attaining median line, chaetotaxy as in *A. invenusta*, n. sp. Plates not extending posteriorly as far as pygofer apex, with uniseriate macrosetae and a few microsetae. Style in broadest aspect with apex rounded. Aedeagus with an elongate tapered process arising near base of shaft and extending almost to its apex, an anteapical acute dorsal process extending beyond gonopore and slightly decurved, and an anteapical short lobate ventral process. Female abdominal sternum VII with a narrow median lobe that is angular apically.

Crown, pronotum, and scutellum dark orange, with a basal and an apical black spot on median line of crown and a median black spot on disk of scutellum, with varying less pronounced dark markings on crown and pronotum; forewing darker orange with dull yellow variable stripes in some of the cells, more conspicuous in the brachial cell; face and thoracic pleura concolorous with crown and pronotum; legs darker orange to tan except darker apices.

Holotype, one additional male, and one female, "Chapada", Brazil, April, and one female, same data except date which is May (C. F. Baker collection); one female, Posadas, Misiones, Argentina, November, 1941 (Daguerre) (all USNM).

A. grammaca, n. sp. differs markedly from other species of the genus in the form of the aedeagus of the male.

Amblyscarta invenusta, NEW SPECIES

FIGURE 146, PAGE 188

Length 10.0-11.0 mm. Head moderately produced for the genus, median length of crown varying from slightly more than one-third to more than one-half interocular width and from slightly less than one-fourth to slightly more than one-third transocular width, antennal ledges not protuberant, clypeus slightly flattened, transclypeal suture entire. Pronotum with lateral margins parallel, posterior margin weakly convex or weakly concave, disk not punctate nor rugose, scutellum not striate behind transverse sulcus. Forewing with membrane which is fumose apically, veins not elevated. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere varying from slightly less than to slightly greater than combined length of more distal tarsomeres.

Male pygofer weakly produced, posterior margin broadly convex except for a slightly concave portion below apex of dorsal margin, without processes, with macrosetae submarginal along posterior and posteroventral margin, disk with number of elongate microsetae. Plates extending posteriorly beyond apex of pygofer, with multiseriate macrosetae on ventral surface and elongate microsetae along lateral margin. Style in broadest aspect with apex obliquely

subtruncate. Aedeagus broad in lateral view, keeled laterally, dorsoapical margin produced in an arcuate process which is tapered, rounded apically, curved dorsally and posterodorsally. Female abdominal sternum VII produced posteriorly in a median triangular lobe which is rounded at apex and with an oblique keel on each side of disk in apical half.

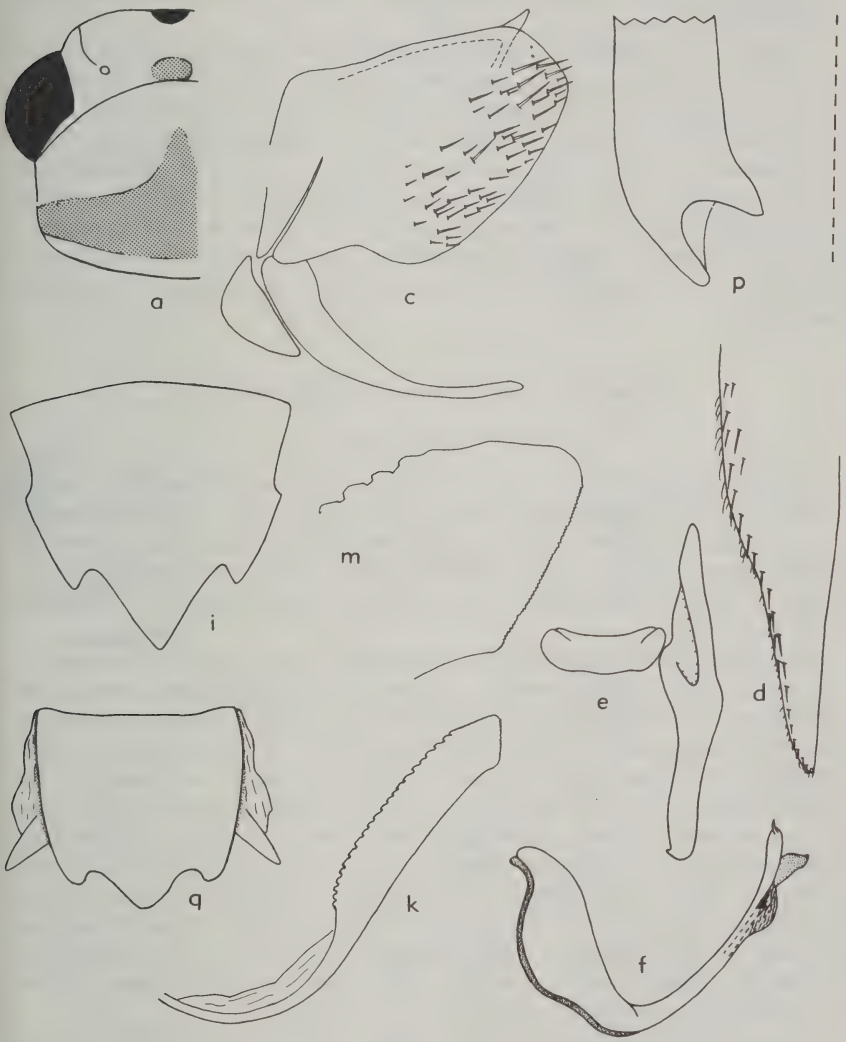


FIGURE 142.—*Amblyscarta pulchra* (F.) (*i* from lectotype; remainder from specimens from French Guiana): *p*, Male pygofer apex, left side, from dorsal view; *q*, female sternum VII, from macerated specimen, showing processes from genital chamber.

Color of crown and anterior half of pronotum dull orange, with a narrow round spot at apex and an elongate narrow marking bordering base of crown, black; posterior portion of pronotum purple with pale dots and vermiculations; scutellum concolorous with crown, with a median indistinct dark marking. Forewings concolorous with posterior portion of pronotum, but with vermiculations larger; membrane including apical cells and apical portions of anteapical cells; face concolorous with crown; legs variable in color, from dull yellow to dark gray.

Holotype male, Colombia, 1941 (L. Richter) on indefinite loan to USNM from NCS. A good number of specimens have been studied from British and French Guiana; Venezuela; several localities in the Amazon Valley; Bahia, Paraná and Santa Catharina, Brazil; and from Misiones, Argentina.

A. invenusta, n. sp., is somewhat similar to the female lectotype and only known specimen of *A. stillifera* (Stål), from which the females differ in that the posterolateral margins of abdominal sternum VII are slender and angulate in *invenusta,* rounded in *stillifera.* The museum collections studied contain more specimens of *invenusta* than of any other species of the genus from South America.

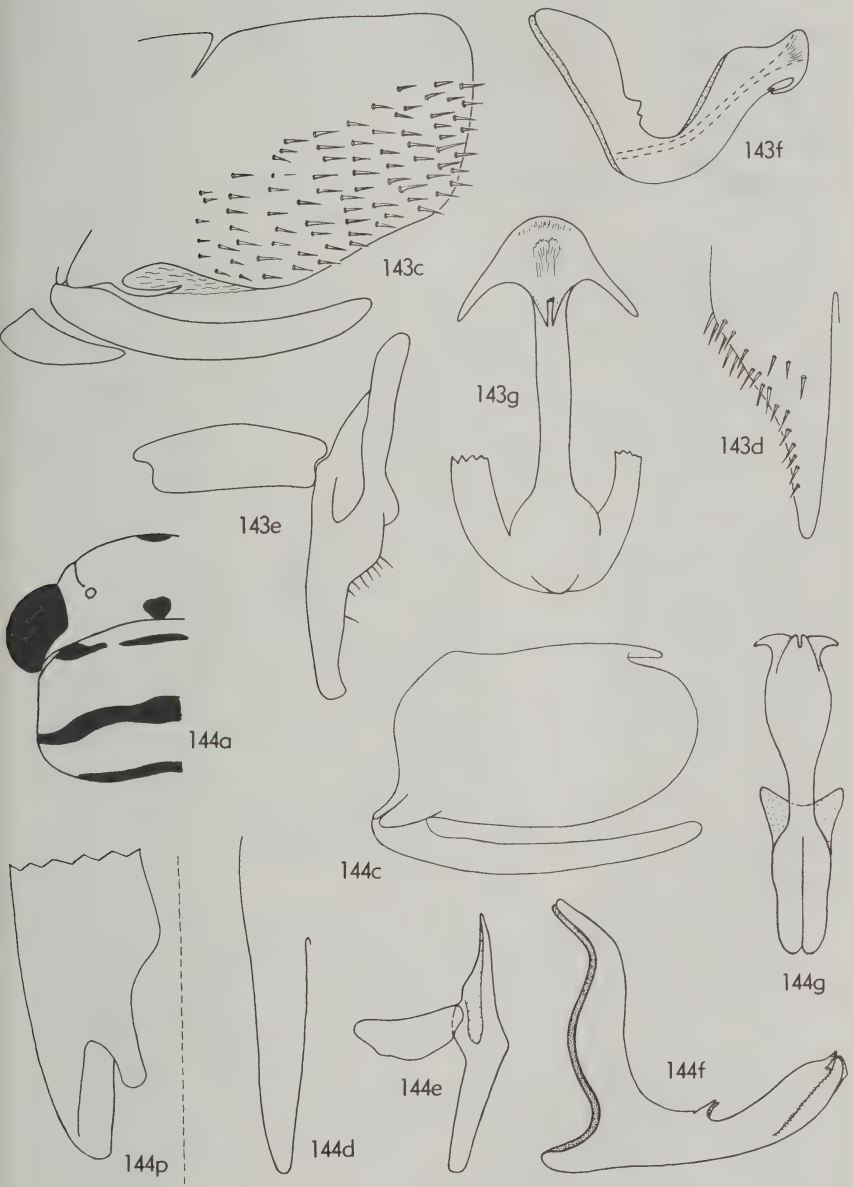
Amblyscarta alternata, NEW SPECIES

FIGURE 140, PAGE 183

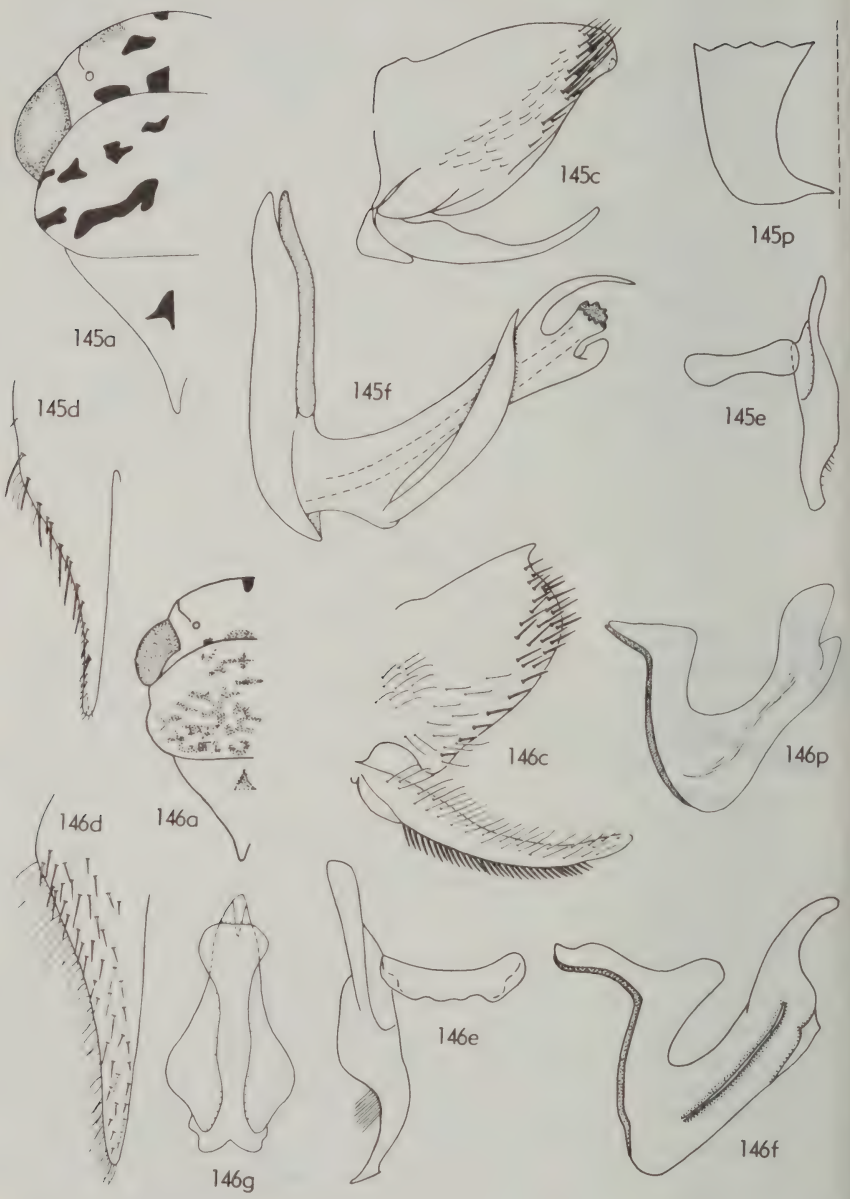
Length of male 10.7-10.8 mm, of female 10.2 mm. Head with median length of crown varying from one-third to slightly more than four-tenths interocular width and from approximately one-fifth to one-fourth transocular width, clypeus slightly convex. Hindleg with femoral setal formula 2:1:1, length of first tarsomere slightly greater than combined length of second and third tarsomeres.

Male pygofer moderately produced, posterior margin as in *A. invenusta,* n. sp., except that convex portion is more convex and concave portion less strongly so than in *invenusta,* with macrosetae irregularly arranged near and on posterior margin and a few located more basad on posterior half of disk. Plates extending posteriorly as far as apex of pygofer, each with many macrosetae located on lateral margin and a few on ventral surface near lateral margin on basal half near midlength. Style in broadest aspect with apex truncate. Aedeagus not unusually broad in lateral view, dorsoapical margin not produced, apex of shaft quadrate in lateral view, shaft in ventral view abruptly narrowed in apical third and without apical processes. Female abdominal sternum VII with posterior margin trilobate with median lobe broader than lateral lobes but scarcely extending farther posteriorly than latter. Other structural characters as in *A. invenusta,* n. sp.

Color of dorsum orange, a spot at base of crown and another at apex, posterior submarginal area of pronotum, and three broad transverse stripes on forewings, the most anterior interrupted by scutellum, the remaining two continuous across commissural margins of wings in repose, black; face, venter, and legs, orange.



FIGURES 143, 144.—143, *Amblyscarta incorrupta* Melichar, lectotype. 144, *A. digitata,* n. sp., holotype (setae not shown in *c* or *d*): *p,* Male pygofer apex, left side, from dorsal view.



FIGURES 145, 146.—145, *Amblyscarta grammaca,* n. sp., holotype: *p,* Male pygofer apex, right side, from ventral view. 146, *A. invenusta,* n. sp. (*d, g, p,* from specimen from French Guiana; remainder from Misiones, Argentina): *p,* Aedeagus from lateral view.

Holotype male and one female, Coary, Upper Amazon; and two males and one female, Teffé, Upper Amazon, both localities in northeastern Brazil; two males and one female, Rio Autaz, Brazil, all specimens in RMS.

A. alternata, n. sp., differs from all other species of the genus in its color pattern and in the form of the aedeagus in ventral view.

Amblyscarta obscura, NEW SPECIES

FIGURE 153, PAGE 196

Length of male 12.8 mm, of female 11.8-13.3 mm. Head slightly produced for the genus, median length of crown varying from slightly less than to slightly greater than one-third interocular width and slightly more than one-fifth transocular width. Pronotum with disk sparsely punctate.

Male pygofer well produced, posterior margin convex except for slight concavity below apex of dorsal margin, with numerous macrosetae located in broad band parallel to posterior and posteroventral margins. Plates extending posteriorly approximately as far as apex of pygofer, with multiseriate short macrosetae on ventral surface. Style rounded at apex. Aedeagus in lateral view of moderate width for the genus, shaft with pair of dorsal processes near base; in caudoventral view shaft slightly narrowed anteapically, apex expanded laterally in short triangular process on each side, apical margin concave. Female abdominal sternum VII trilobate, with lateral lobes much as in accompanying illustration (fig. 142*q*) of *A. pulchra* (Fabricius), and the median lobe acute at apex. Other structural characters as in *A. invenusta,* n. sp.

Color of crown, pronotum, and scutellum, orange to yellow, with median conspicuous spot at base and at apex of crown, a narrow transverse arcuate impressed marking near and parallel to anterior margin and a wider transverse band which is variable on posterior half of pronotum, a transverse marking on sulcus of scutellum, purplish-black. Forewings dull purple of an intensity which varies individually, with a transverse broad area approximately at midclavus which may be pellucid (type) or not, crossing commissural margins of wings at rest, bordered before and behind by darker purple transverse stripes. Face and venter yellow to orange, legs darker apically.

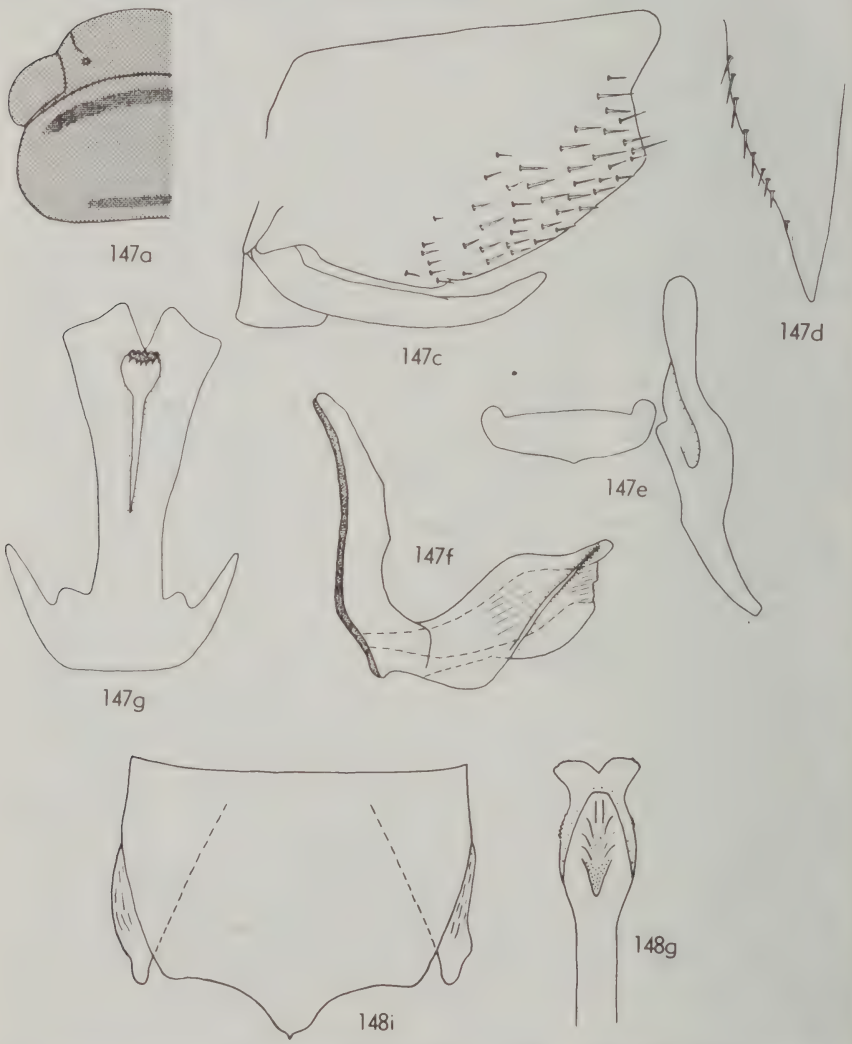
Holotype male, Nova Olinda, Rio Purús, Brazil (S. M. Klages), June, 1922 (CM). Four females, Achinamiza, Peru, January 10, February 12 and August 27 (AMNH). One male, Purús River, Brazil (RMS).

A. obscura, n. sp., is similar in size and form to *A. pulchra* (Fabricius) from which it differs in its lack of a pygofer process, its broader aedeagus in lateral aspect, its processes near the base of the aedeagal shaft in the male, and the more abruptly acute median lobe of the posterior margin of the female abdominal sternum VII. The last is similar to that of *A. trinotata,* n. sp. (fig. 148*i*).

Amblyscarta binotata, NEW SPECIES

FIGURE 154, PAGE 196

Length of male 9.6-10.3 (type) mm, of female 9.7-9.9 mm. Head with median length of crown varying from slightly more than one-third to slightly more than four-tenths interocular width and approximately one-fourth transocular width, antennal ledges slightly protuberant or not. Pronotum with disk



FIGURES 147, 148.—147, *Amblyscarta inca* (Distant) (specimen from Cachabé, Ecuador). 148, *A. trinotata*, n. sp. (*g* from holotype; *i* from specimen from Río Santiago, Peru): (only apical portion of shaft shown in *g*).

weakly rugose or not. Forewing with veins slightly elevated. Hindleg with femoral setal formula 2:1:1.

Male pygofer well produced, dorsal margin decurved slightly at apex in lateral view, posteroventral margin broadly convex, with a number of small submarginal macrosetae located in area parallel to posteroventral margin. Plates not extending as far posteriorly as apex of pygofer, with uniseriate short macrosetae. Style with a small apical hooklike process. Aedeagus broad in lateral view, keeled laterally, with a pair of short dorsal processes at base of shaft extending laterally at right angles to axis of shaft which is broadest in apical half and with apical margin truncate and very slightly concave. Female abdominal sternum VII with posterior margin rounded laterally, broadly produced medially and acute at apex. Other structural characters as in *A. invenusta,* n. sp.

Color of crown, pronotum, and scutellum, dull orange, with an inconspicuous transverse marking at base and a spot at apex of crown, a transverse stripe across pronotum near posterior margin, purple to black, the area behind the pronotal stripe variable in color. Forewings blue with a pair of narrow transverse purple stripes, one attaining commissural margin at apex of inner claval vein, the other between apex of outer claval vein and claval apex. Face and venter concolorous with crown. Legs slightly darker than venter.

Holotype male, three additional males and four females, Fontebõa, Amazonas, Brazil; one female, "Olivenca", Brazil; and two females, Iquitos, Peru (RMS).

A. binotata, n. sp., is related to *A. obscura,* n. sp. (above) in the structure of the genitalia, but the aedeagal shaft in caudoventral view is more broadly expanded in the apical half and scarcely narrowed before the apex. It is also closely related to *A. trinotata,* n. sp. (below) in the discussion of which distinguishing characters are treated.

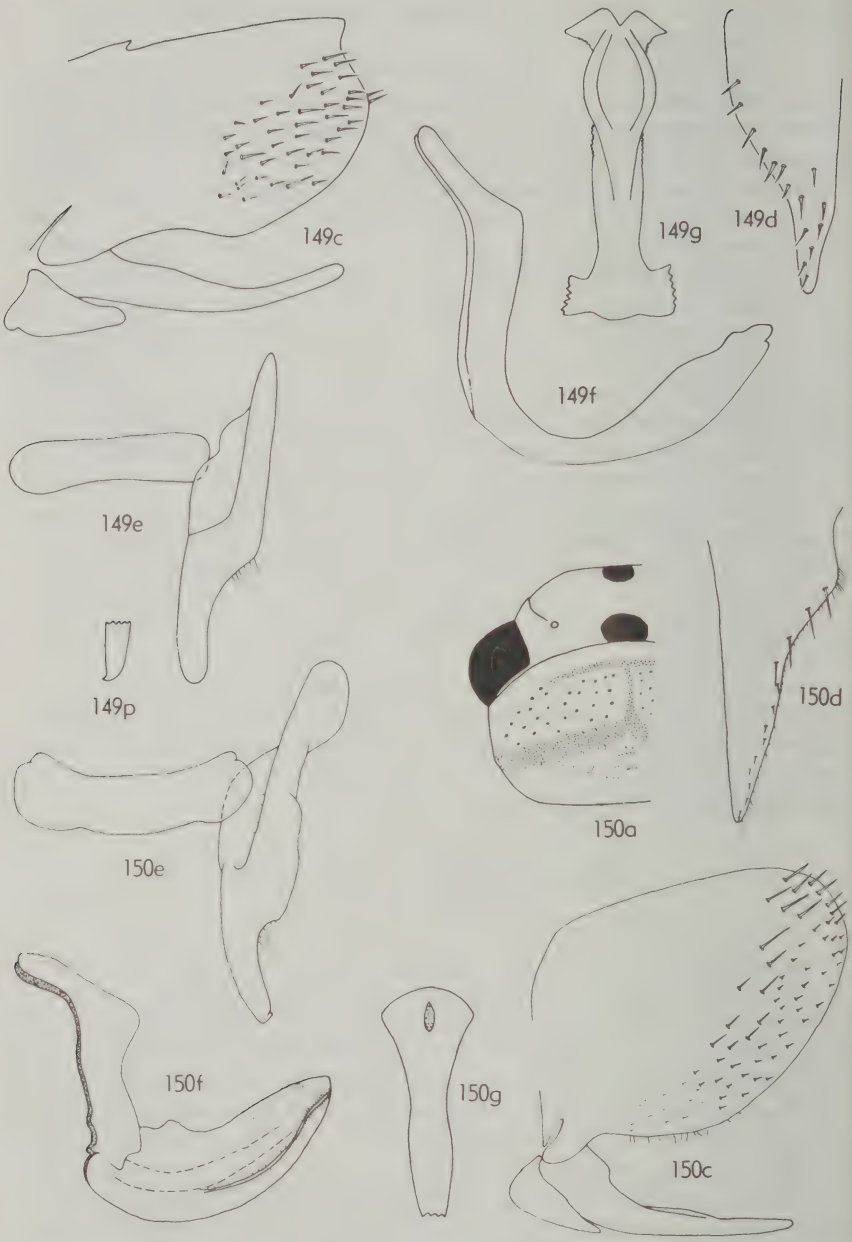
Amblyscarta trinotata, NEW SPECIES

FIGURE 148

Length of male 10.0-10.2 mm, of female 10.5-11.0 mm. Head with median length of crown from one-third to slightly more than four-tenths interocular width and from one-fifth to one-fourth transocular width, clypeus varying from slightly convex to slightly flattened medially. Pronotum with disk varying from smooth to rugulose or rugose, scutellum with portion behind transverse sulcus rugulose or not. Forewing with membrane not fumose apically. Hindleg with femoral setal formula 2:1:1. Other characters except genitalia as in *A. invenusta,* n. sp.

Male genitalia as in *A. binotata,* n. sp., except aedeagal shaft which is less broadened in apical half, constricted anteapically and with apical margin angularly emarginate. Female abdominal sternum VII with posterior margin broadly produced posteriorly, the margin of the produced portion abruptly narrowed to an acute minute apex.

Color of crown, pronotum, and scutellum, dull orange to sordid yellow, with (type) or without a black spot at apex of crown, with a transverse black



FIGURES 149, 150.—149, *Amblyscarta venosa* (Signoret) (from specimen from Colombia; only aedeagal shaft shown in *g*): *p*, Apex of style from lateral view. 150, *A. venata*, n. sp., holotype (only apical portion of aedeagal shaft shown in *g*).

stripe near and parallel to posterior pronotal margin, not attaining lateral margins. Forewings pale sordid purple, with three transverse narrow purple stripes (two, in type) all extending from costal to commissural margin, the anteriormost narrower than others and attaining commissural margin of wings in repose before scutellar apex, the second attaining commissural margin just behind apex of inner claval vein, the third just before claval apex. Face and venter concolorous with crown, legs darker apically.

Holotype male, Achinamiza, Peru, January 14, 1926, "F 6021", H. Bassler Collection and one teneral male, same data except "F 6001"; one female, same locality, December 26, 1925, "F 6001"; two females, Upper Marañon, Peru, September 19, 1924 and September 9, 1924, both "F 6029"; two females, Río Santiago, Peru, October, 1928; four females, Tingo María, Peru, October 3, October 17, and October 21 (2), 1946, all 2200 ft. (AMNH). Two females, Yurimaguas ["Jurimaguas"] and "Ucayale" [Ucayali River?], Peru (RMS). One male Benevides, Para, Brazil, October 1918 (S. M. Klages) (CM). One pair *in copula,* Monsón Valley, near Tingo María, Peru (CAS).

A. trinotata, n. sp., is closely related to *A. binotata,* n. sp. (above), but differs in the form of the aedeagus in caudoventral view as described above, and in the usual presence of three transverse dark lines across the forewings.

Amblyscarta digitata, NEW SPECIES

FIGURE 144, PAGE 187

Length of male 11.5-12.0 mm. Head very broad and only slightly produced for the genus, median length of crown slightly more than four-tenths interocular width and slightly more than one-fourth transocular width, clypeus broadly flattened. Pronotum with posterior margin weakly concave. Forewing with veins elevated and distinct. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of second and third tarsomeres. Other non-genital structural characters as in *A. invenusta,* n. sp.

Male pygofer moderately produced, posterior margin broadly, regularly, convex, dorsal margin with a digitate process arising slightly behind midlength, not differentially sclerotized, extending posteriorly, with macrosetae on posterior and posteroventral portions of pygofer. Plates extending posteriorly slightly beyond apex of pygofer, each with multiseriate macrosetae on ventral surface. Style rounded apically. Female unknown.

Color of crown, pronotum, and scutellum, yellow, a median spot at base of crown and one at apex, an incomplete transverse line across anterior third and two transverse stripes across posterior half of pronotum and a median spot in basal half of scutellum, purple to black. Forewings translucent dull greenish heavily marked with purple, with an indefinite area across middle of corium marked only by purple longitudinal veins traversing it. Face, thoracic pleura, and legs sordid yellow, the legs darker apically.

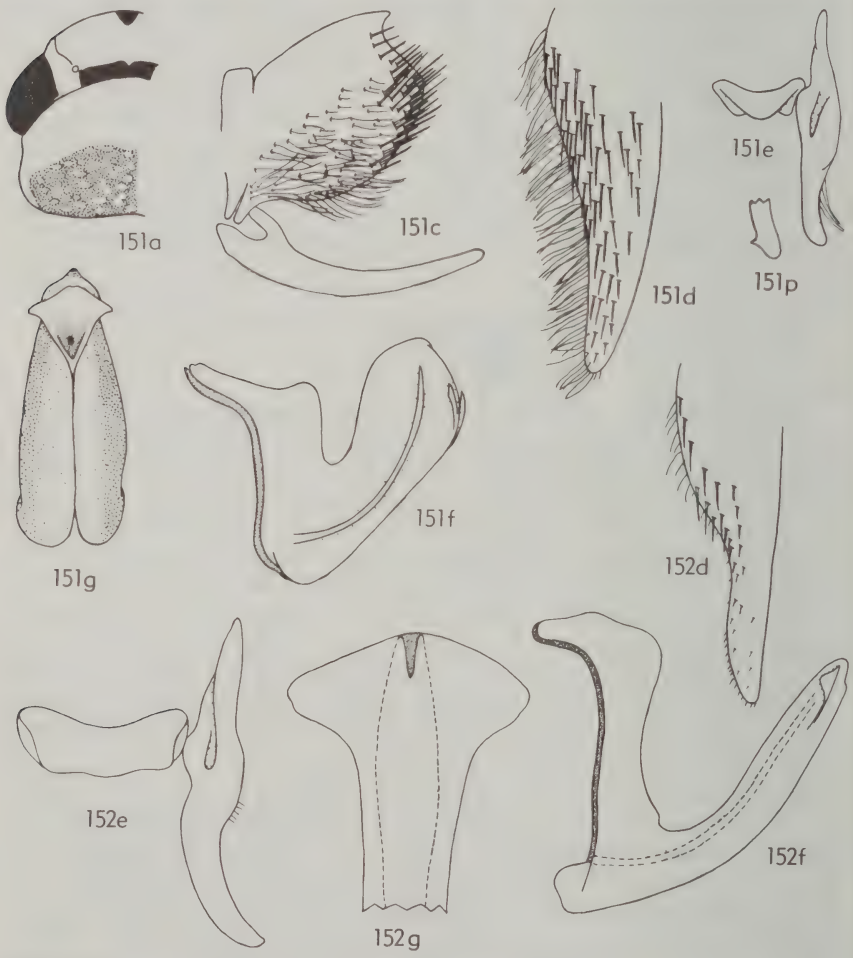
Holotype male, La Esmeralda, Alto Orinoco, Venezuela, 29. VII.51; two males, Culebra, N. Duida, Terr. Amazonas, Venezuela, one April 7-16, 1950 and one July 1-4, 1950 (J. Maldonado Capriles) (Venezuela Expedition); one

male, Upper Cunucunuma, April 28, 1950 and one male, Mouth of Cunucunuma, June 6, 1950, both in Terr. Amazonas, Venezuela (J. Maldonado Capriles) (Venezuela Expedition) (USNM).

Amblyscarta venata, NEW SPECIES

FIGURE 150, PAGE 192

Length of male 12.1 mm. Head with median length of crown approximately four-tenths interocular width and slightly less than one-fourth



FIGURES 151, 152.—151, *Amblyscarta aurulenta* (F.) (from specimen from Colombia; only aedeagal shaft shown in *g*): *p*, Style apex from lateral view. 152, *A. bicincta* (Germar) (from specimen from French Guiana; only aedeagal shaft apex shown in *g*).

transocular width. Pronotum with posterior margin slightly convex, disk sparsely and irregularly punctate, scutellum not striate behind transverse sulcus. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of second and third tarsomeres. Other non-genital structural characters as in *A. invenusta,* n. sp.

Male pygofer well produced for the genus, posterior and posteroventral margins broadly convex, without processes, with a few large and a number of small macrosetae located on posterior and posteroventral portions. Plates not extending as far posteriorly as pygofer apex, each triangular, with a few uniseriate macrosetae on basal half. Style with distinct preapical lobe and slight apical hook. Aedeagus broad in lateral view, keeled laterally, in caudoventral view with shaft broadened apically, with apical margin broadly convex. Female unknown.

Color of crown, pronotum, and scutellum, bright yellow, with a median semicircular spot at base of crown and an oval one at apex, black; an arcuate linear marking near anterior margin of pronotum, a broader transverse arcuate marking on posterior half of disk and the median line between these, purple; scutellum with fumose area at each end of transverse sulcus; forewings concolorous with anterior dorsum, veins except in membrane, an oblique line on each wing extending from apex of inner claval vein posterolaterally to costal margin, a transverse line across wing before claval apex with its posterior margin extending angularly posteriorly, and apical portion of anteapical cells, fuscous. Face, thoracic pleura, and legs, pale yellow, apices of first and second legs and tibial apices of hindlegs, black.

Holotype male, "Tucumupas", Bolivia. December (W. M. Mann), Mulford Biol. Expl., 1921-22.

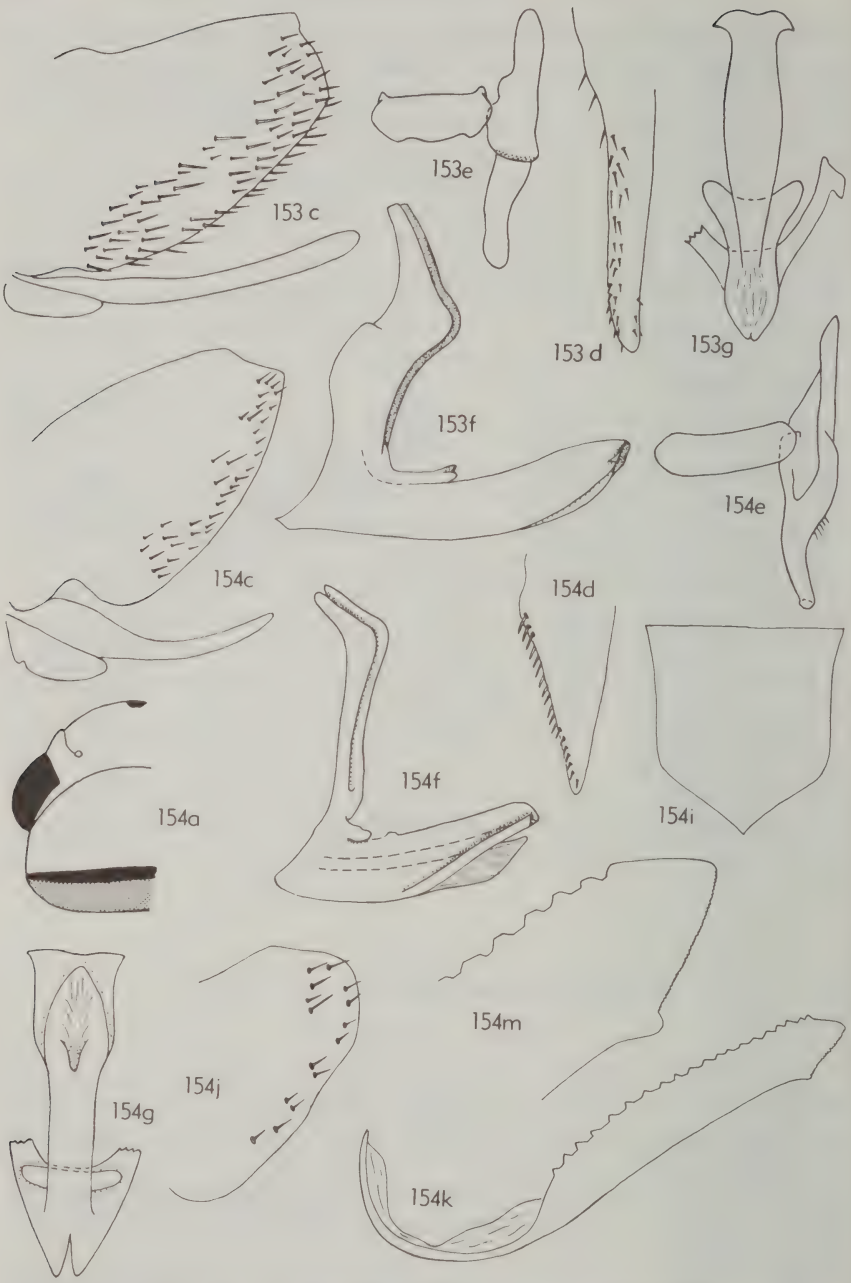
A. venata, n. sp., is similar in form to *A. pulchra* (Fabricius), but differs in that the male pygofer lacks a dorsal process, and in that the aedeagus is broader in lateral view and conspicuously different at apex in caudoventral view.

Amblyscarta incommoda, NEW SPECIES

FIGURE 141, PAGE 183

Length of male 14.5-15.4 mm, of female 14.0-14.9 mm. Head with median length of crown from four-tenths to approximately one-half interocular width and from one-fourth to approximately one-third transocular width. Pronotum with posterior margin weakly convex or weakly concave (holotype). Hindleg with length of first tarsomere equal to or slightly greater than combined length of second and third tarsomeres. Other non-genital structural characters as in *A. invenusta,* n. sp.

Male genitalia as in *A. venata,* n. sp., except that all macrosetae of pygofer are large, and that aedeagus has a prominent lobe on anterior margin of each dorsal apodeme (fig. 141*f*) not present in *venata* and that the aedeagal apex is different in caudoventral view. Female abdominal sternum VII much as in the



FIGURES 153, 154.—153, *Amblyscarta obscura*, n. sp. (from specimens from Purús River, Brazil; one of dorsal apodemes broken in *g*). 154, *A. binotata*, n. sp. (*a*, *c-f*, from specimen from Rio Purús, Brazil; *g* from Fontebõa, Amazonas, Brazil; remainder from Iquitos, Peru).

FIGURES 155-158.—155, *Amblyscarta cervicula* (Jacobi) (from specimen from Bolivia). 156, *A. modesta* (F.), lectotype. 157. *A. schaumi* (Signoret), lectotype (only left side shown). 158, *A. stillifera* (Stål), lectotype.

present illustration of *A. pulchra* (Fabricius) (fig. 142*i*) but with the posterolateral lobes more rounded and not produced as much. The conical lobes of the genital chamber are visible even in dried specimens.

Color of crown, pronotum, and scutellum, sordid orange, with markings as in *venata,* except that spots of head are absent (holotype) or with the basal one paler when present. Forewings pale purplish translucent with dark purple veins and markings much as in *venata* except those at apices of anteapical cells which are less extensive. Face, thoracic pleura, and legs concolorous with crown, legs darkened as in *venata.*

Holotype and one additional male and three females, Teffé, Upper Amazon, Brazil (RMS) and one female topotype (AMNH).

A. incommoda, n. sp., is closely related to *venata* from which it may be distinguished most readily by the aedeagal characters mentioned in the above description.

23. Genus POECILOSCARTA Stål

Figures 159-162

Poeciloscarta Stål, 1869a:73. Type-species *Cicada cardinalis* Fabricius, by subsequent designation of Kirkaldy (1907d:89).

Length 9.2-12.9 mm.

Head well produced, median length of crown varying from six-tenths to approximately eight-tenths interocular width and from four-tenths to one-half

transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown or slightly closer to latter, crown with a slight transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and rectilinear; clypeus slightly flattened medially, muscle impressions distinct or not, transclypeal suture obscure medially, clypellus not strongly produced but in profile with lower portion more nearly horizontal than its upper portion.

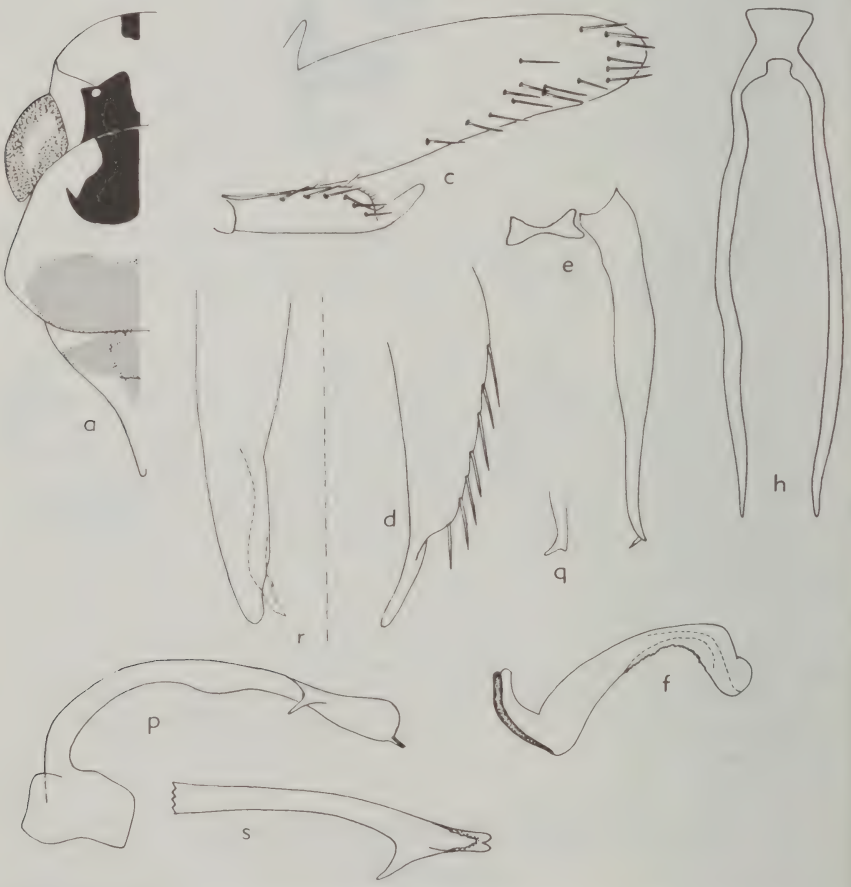
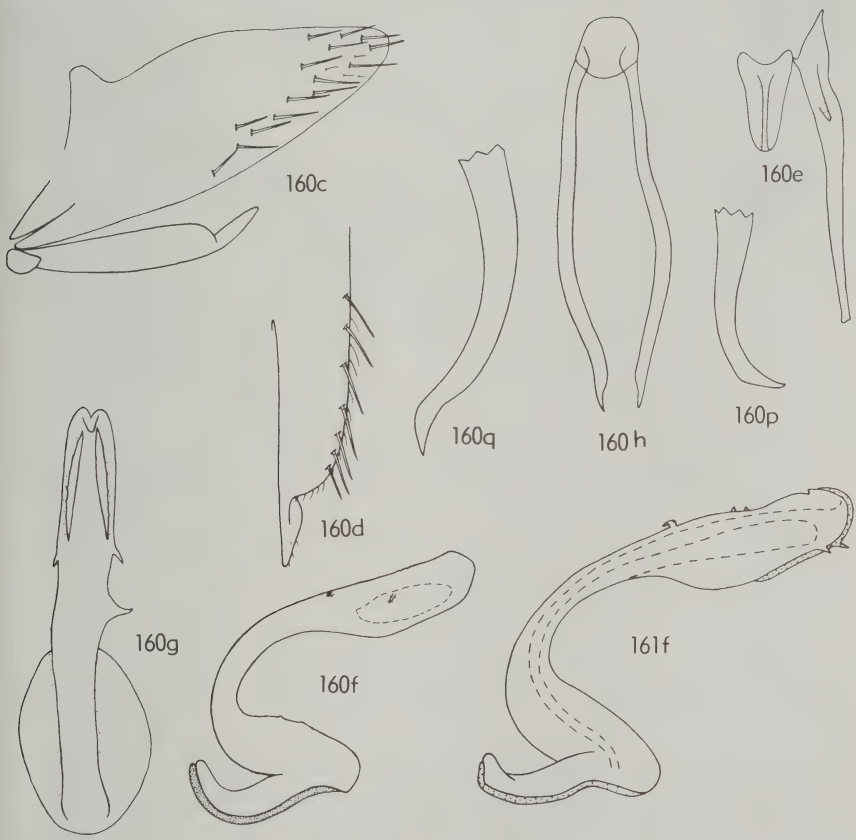


FIGURE 159.—*Poeciloscarta* sp., *cardinalis* (F.) complex (from specimens from Dutch Guiana; *h* from ventral view): *p*, Aedeagus from lateral view; *q*, style apex from lateral view; *r*, male pygofer, left side, from dorsal view; *s*, aedeagal apex from dorsal view (*a*, *f*, *r*, from same specimen; remainder from another specimen).

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete or nearly so, posterior margin varying from slightly convex to slightly concave, disk without sculpturing, without pubescence; scutellum not striate behind transverse sulcus. Forewing with a membrane, veins not very distinct, not elevated, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer narrow and strongly produced posteriorly, posterior margin convex, narrowly rounded, setae occurring mostly on posterior half of pygofer, processes absent. Plates triangular, abruptly narrowed anteapically,



FIGURES 160, 161.—160, *Poeciloscarta* sp., *cardinalis* (F.) complex (from specimen from Santarém, Brazil; *h* from dorsal view): *p*, Style apex from lateral view; *q*, ramus of paraphyses, apical portion, from lateral view. 161, *P. cardinalis* (F.) (from specimen compared with lectotype).

not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae. Style with or without preapical lobe. Connective not fused with paraphyses which consist of a short basal portion and slender, elongate rami. Aedeagus with shaft elongate, often asymmetrical as result of unpaired short processes.

Female abdominal sternum VII very narrow, strongly produced posteriorly. Dorsal membrane of genital chamber with or without a conspicuous median plate. Ovipositor with valvulae II each expanded in apical two-thirds of portion beyond basal curvature, broadest before midlength, dorsal margin of the

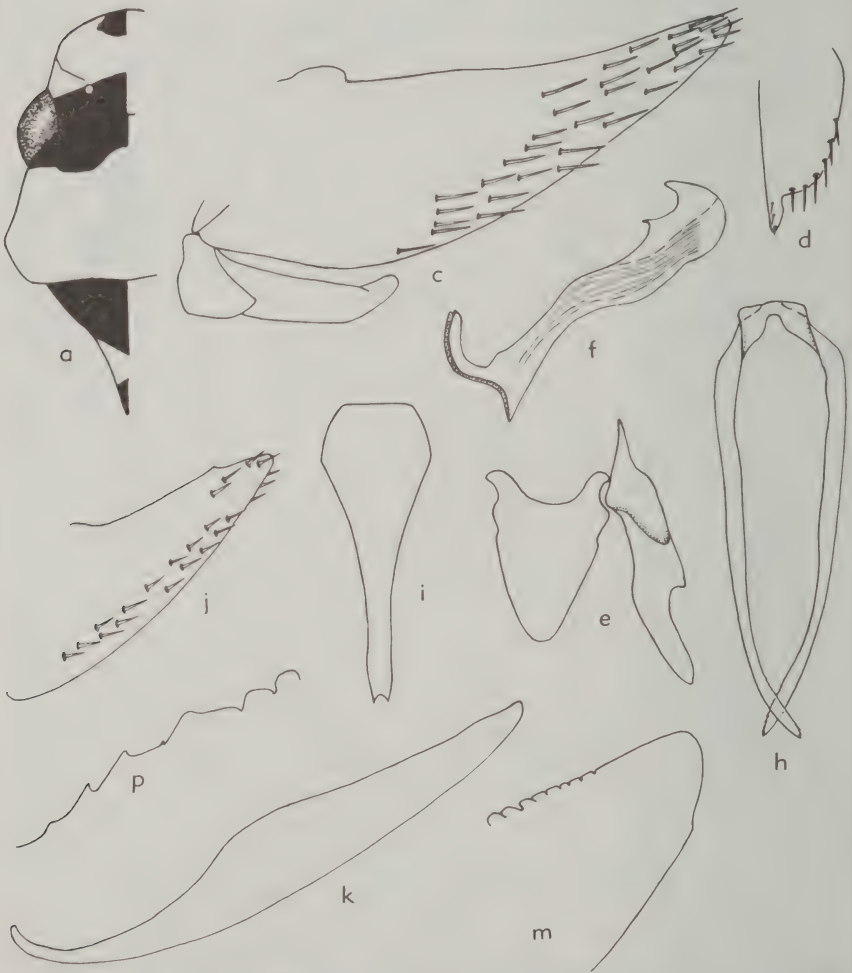


FIGURE 162.—*Poeciloscarta aurorula* (Breddin) (*a* from specimen from Bogotá, Colombia; *c-e*, *h*, from Tumupasa, Bolivia; remainder from Tingo María, Peru): *p*, Teeth at base of toothed portion of second valvula of ovipositor.

expanded portion bearing large irregular primary teeth near base, the teeth becoming progressively smaller apically and ending slightly before apex; apex narrowly rounded. Pygofer slender, narrowly rounded at apex, with multiseriate setae parallel to posteroventral margin and a few at pygofer apex.

Species of *Poeciloscarta* are quite variable in color.

Specimens belonging to *Poeciloscarta* have been examined from the Guianas and from the Amazon Valley in Venezuela and Brazil, and from Peru and Bolivia. The genus is related to *Janastana*, new genus, and *Cardioscarta* Melichar in the discussions of which distinguishing characters are treated. These three genera have the pygofer moderately (*Janastana*) to well produced in the males, and abdominal sternum VII elongate in the females. The second valvulae of the ovipositors also have similarities.

My interpretation of *Tettigonia aurorula* Breddin is based on an examination of a female from DEI. This specimen is here designated as lectotype. It bears labels: "Süd-America/Cumbase" and "Type" and "Tettigonia/aurorula/Bredd." and "Coll. Breddin", and the lectotype label. This species, dull orange with a transverse stripe behind the pronotum and a second behind the clavus, in addition to the crown markings, is easily distinguished externally by this color pattern. The aedeagus of the male is different from other forms in the genus.

The genitalia of the male lectotype of *Cicada cardinalis* Fabricius are like the specimen illustrated here from Santarém, Brazil, except for minor differences in the aedeagus, which are illustrated. There may be several species close to *cardinalis*, with only small differences, externally and in the male genitalia. Many more specimens would have to be studied to assess the constancy and significance of the small differences. Walker's *Tettigonia extricans*, of which the male lectotype has been studied falls in this complex. The aedeagus is very close to the specimen from Santarém, Brazil illustrated in figure 160*f*.

SPECIES OF *POECILOSCARTA*

aurorula (Breddin), 1901d:84 (*Tettigonia*). Colombia, Peru, Bolivia, W. Brazil.
cardinalis (Fabricius), 1803a:71 (*Cicada*). Colombia, the Guianas, N. Brazil, central Brazil.
extricans (Walker), 1858a:215 (*Tettigonia*). NE. Brazil.

24. Genus CARDIOSCARTA Melichar

Figures 163-168

Cardioscarta Melichar, 1932a:285. Type-species: *Cicada* [*quadri-*] *fasciata* L., by original designation.

Length 8.8-12.4 mm.

Head well produced, median length of crown from slightly less than six-tenths to three-fourths interocular width and from four-tenths to slightly less than one-half transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each usually approximately equidistant from adjacent anterior eye angle and median line of crown, crown with or without a slight concavity across ocelli, without a median fovea and without sculpturing

or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins usually convex and oblique; clypeus convex, muscle impressions distinct or not, transclypeal suture obscure medially, clypellus not strongly produced, but in profile with its lower portion more nearly horizontal than upper portion.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin varying intraspecifically from slightly convex to slightly concave, disk without sculpturing, without pubescence; scutellum not striate behind transverse sulcus. Forewing with a membrane, veins not very distinct, elevated or not, with four apical cells of which base of fourth is usually more proximal than base of third, without an anteapical plexus of veins, texture from weakly to strongly coriaceous and without sculpturing; forewings of female in rest

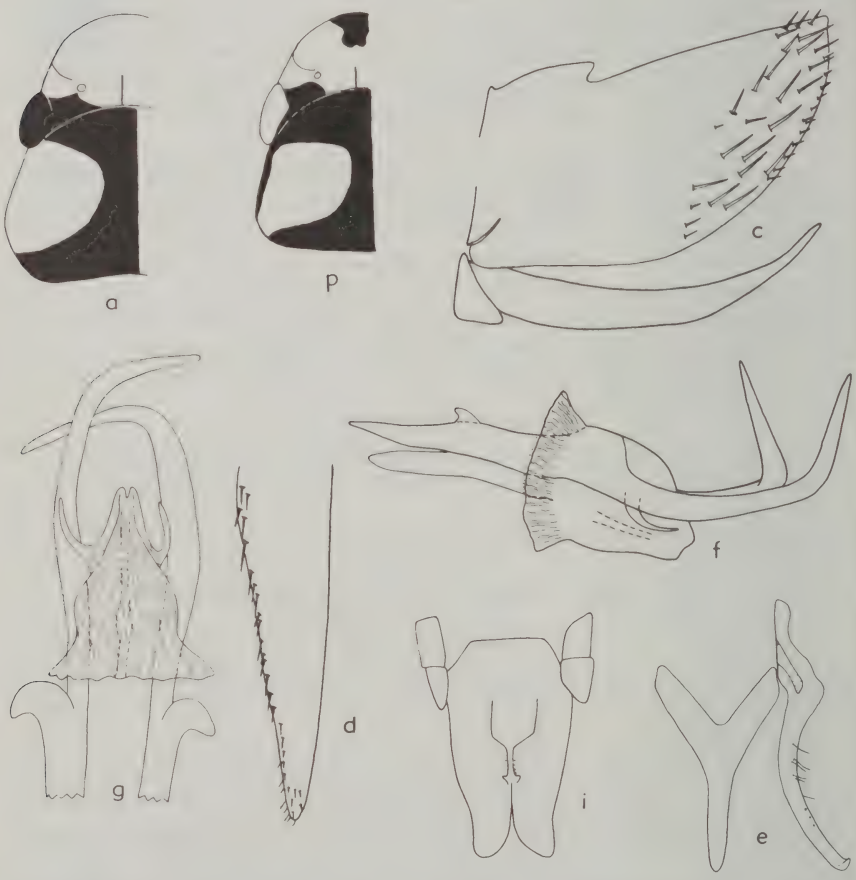


FIGURE 163.—*Cardioscarta electa* Melichar (*a, i,* from lectotype; remainder from specimen from Ecuador): *p,* Anterior dorsum.

position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately to strongly produced, not strongly narrowed, posterior margin convex, setae variable interspecifically from numerous in apical half to few and located anteapically, without microsetae;

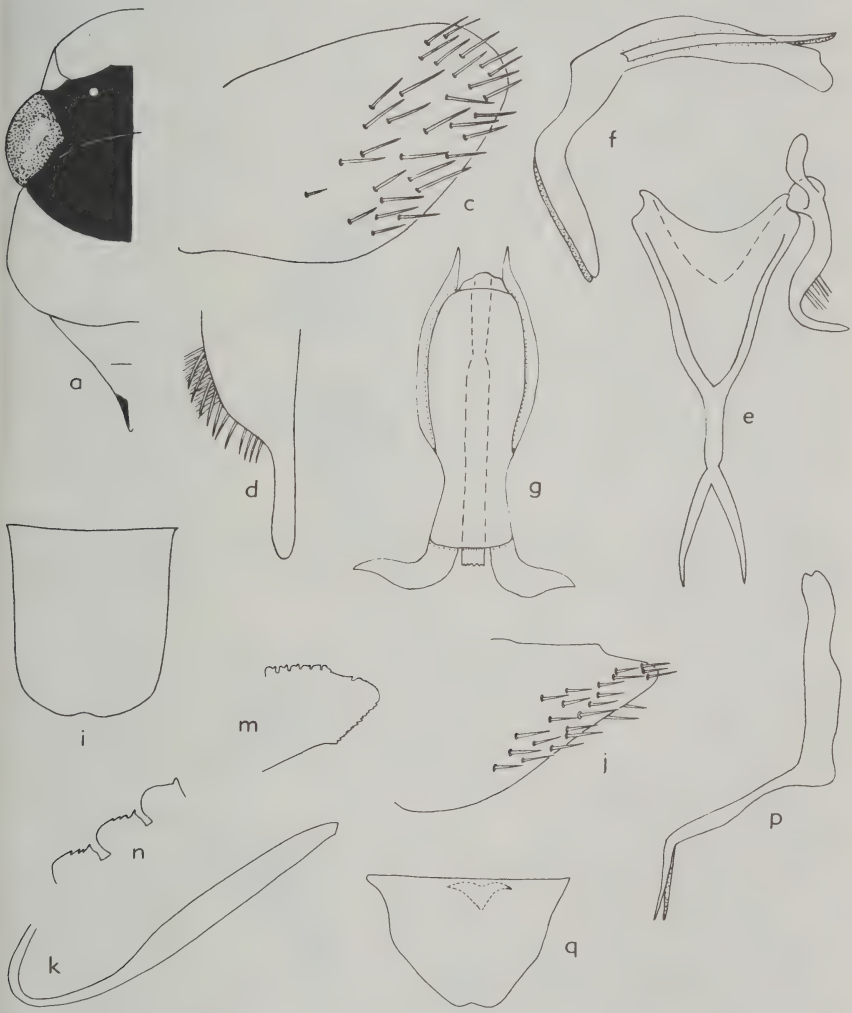


FIGURE 164.—*Cardioscarta quadrifasciata* (L.) (*a* from specimen from French Guiana; *c, d, f, g, p,* from Rio Autaz, Amazonas; *i-k, m, n, q,* from Río Perené, Peru; plate not shown in *c; e,* showing style, connective and fused paraphyses): *p,* Connective and paraphyses, lateral view; *q,* median sclerite in membrane of genital chamber.

pygofer process absent. Plates triangular, not extending posteriorly nearly as far as pygofer apex, setal arrangement variable interspecifically. Style without preapical lobe. Connective fused with paraphyses or not when latter are present. Aedeagus with shaft slender and elongate, with a pair of processes arising at base or on basal half of shaft, often slightly asymmetrical. Paraphyses stalked and symmetrical, or absent.

Female abdominal sternum VII well produced, posterior margin varying from almost transverse (*C. quadrifasciata* (L.)) to broadly emarginate with the posterior margin of the emargination convex, disk usually with a narrow longitudinal flattened portion (exception: *quadrifasciata*). Dorsal membrane of genital chamber bearing a conspicuous median plate. Ovipositor with second valvulae each broad in apical two-thirds of portion beyond basal curvature, the dorsal margin of expanded portion regularly convex and bearing numerous small quadrate primary teeth, extending almost to apex; apex narrowly rounded, apicoventral margin with very fine denticulations. Pygofer slender, narrowly rounded at apex, with a number of macrosetae in a broad group parallel to posteroventral margin.

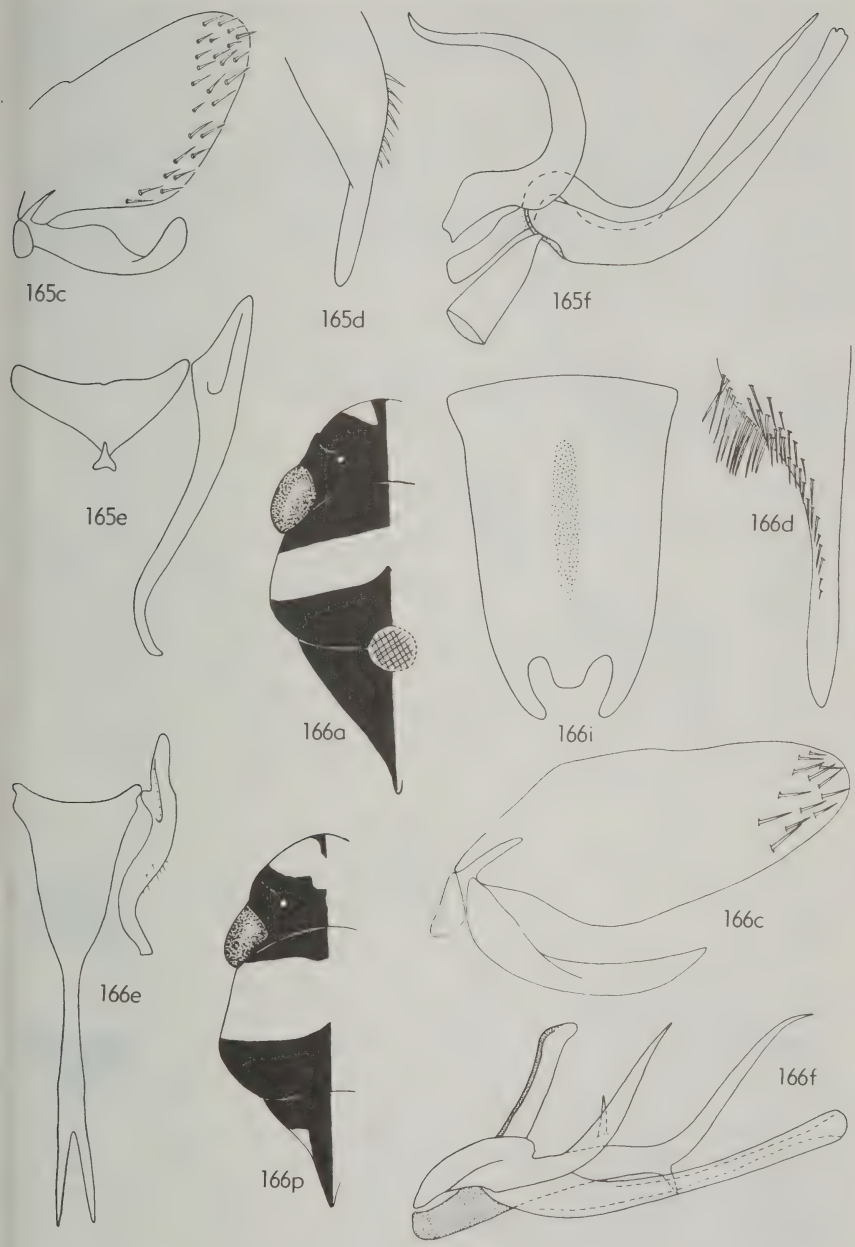
Species of *Cardioscarta* are quite variable in color.

Specimens belonging to the genus *Cardioscarta* Melichar have been examined from Colombia and the Guianas to southern Brazil and Bolivia. *Cardioscarta* is related to *Poeciloscarta* Stål and to *Janastana*, new genus (see discussion of *Poeciloscarta*). It may be separated from *Poeciloscarta* by the male plates which are not abruptly narrowed anteapically and by the basal aedeagal processes. For distinguishing characters of *Janastana*, see the discussion of that genus (below).

The identity of *Tettigonia albigutta* Walker and of *Cardioscarta fatidica* Melichar is based on an examination of the holotype and lectotype, respectively, of these nominal species. My interpretation of *Cardioscarta electa* Melichar is based on a study of the lectotype.

My identification of *Tettigonia flavifrons* Signoret is based on a dissection of a male (fig. 165) in the Signoret collection in Vienna. I have seen no specimen eligible as lectotype of this nominal species. Signoret stated that it was described from the collections of Germar and Boheman. *T. flavifrons* has page priority over *T. crocipennis* Signoret which was also described from the Germar collection. A male specimen of *crocipennis* studied in ZIMH from the Heyer collection, and possibly eligible to be lectotype of *crocipennis* also has genitalia like figure 165 and *crocipennis* is suppressed because of this.

Metcalf (1949b:266) renamed *fasciata* Melichar in the belief that Melichar had misdetermined (*fasciata* L.) = *quadrifasciata* L. I accept *Cicada quadrifasciata* L. as the species Melichar had at hand. He referred to the page number of *quadrifasciata* in the 1767 Linnean work, but called the species *fasciata* L., an obvious *lapsus*. Metcalf (*loc. cit.*) said it was a typographical error. Although I have not seen Linnaeus' specimens of *quadrifasciata*, the present interpretation is consistent with Fabricius' identification, and with that of most subsequent authors. Metcalf's substitute name, *Poeciloscarta nigrofasciata* is therefore relegated to synonymy under *quadrifasciata* L. It was a substitute name without a type-specimen. His objections to the length of the male plates (long *vs.* short) is relative and indecisive unless the length is compared to something. I



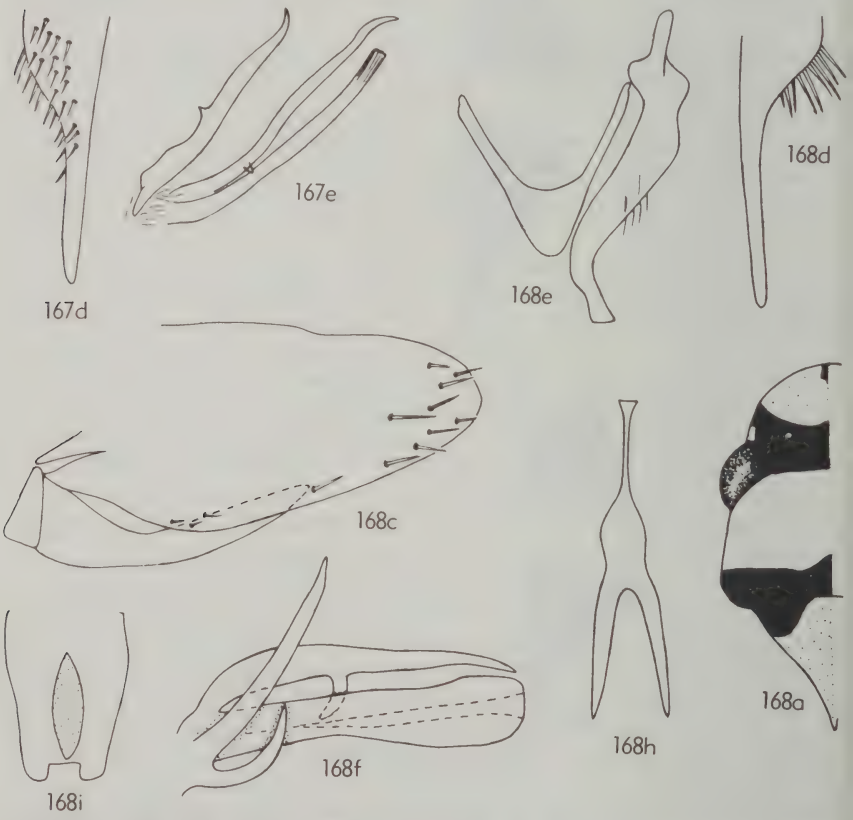
FIGURES 165, 166.—165, *Cardioscarta flavifrons* (Signoret) (from specimen labeled "Amer." in Signoret collection, NMV). 166, *C. albigutta* (Walker) (*a*, *i*, from holotype; *p* from lectotype of *Tettigonia fatidica* Melichar; remainder from specimen from Brazil; paraphyses shown in *e*): *p*, Anterior dorsum.

have followed Blanchard (1850a:190) and other authors in listing *Tettigonia miniata* Germar in synonymy under *quadrifasciata*, as a result of an examination of specimens which were apparently syntypes of *miniata* from the Heyer collection in ZIMH.

The present interpretation of *Cardioscarta sponsa* Melichar is based on a study of the male lectotype. I have based my interpretation of *Tettigonia vernicosa* Le Peletier and Serville on four specimens in the museum in Paris, agreeing with Signoret's illustration (1853b: pl. 12, fig. 7), but without any indication that they might be types. The male genitalia of one of the specimens are like the present illustration of *sponsa*, except for the structures illustrated in figure 167.

SPECIES OF *CARDIOSCARTA*

albigutta (Walker), 1851b:753 (*Tettigonia*). S. Brazil. New combination.
fatidica Melichar, 1932a:312. New synonymy.
electa Melichar, 1932a:307. Ecuador, Bolivia.



FIGURES 167, 168.—167, *Cardioscarta vernicosa* (L. & S.) (from specimen from Brazil). 168, *C. sponsa* Melichar (*i* from specimen from Rio Grande do Sul, Brazil; remainder from lectotype; *h* from dorsal view).

flavifrons (Signoret), 1853b:350 (*Tettigonia*). Brazil. New combination.
crocipennis (Signoret), 1853b:351 (*Tettigonia*). New synonymy.
quadrifasciata (L.), 1758a:436 (*Cicada*). Colombia, Br. and Fr. Guiana, Peru, Bolivia. New combination.
fasciata Melichar, 1932a:285 (*err. pro quadrifasciata* L.) (*Cicada*).
miniata (Germar), 1821a:69 (*Tettigonia*).
nigrofasciata (Metcalf), 1949b:266 (*Poeciloscarta*). New synonymy.
sponsa Melichar, 1932a:311. S. Brazil.
vernicosa (Le Peletier and Serville), 1825a:601 (*Tettigonia*). S. Brazil.

KEY TO SPECIES OF *CARDIOSCARTA*

1. Specimens yellow to orange with transverse black bands 2
   Specimens not colored as above 3
2. Pronotum with two large pale orange spots narrowly separated medially *electa* Melichar (fig. 163)
   Pronotum without pale spots ..... *quadrifasciata* (L.) (fig. 164)
3. Forewing yellowish-orange with black markings at apex; paraphyses absent in male ..... *flavifrons* (Signoret) (fig. 165)
   Forewing not so; paraphyses present in male 4
4. Forewing opaque, black, with white markings *albigutta* (Walker) (fig. 166)
   Forewing yellow or orange with longitudinal black markings 5
5. Forewing with claval suture and commissural margin black *vernicosa* (Le Peletier and Serville) (fig. 167)
   Forewing with only a narrow costal black stripe *sponsa* Melichar (fig. 168)

25. KOGIGONALIA, NEW GENUS

FIGURES 169-174

Type-species: *Kogigonalia dietzi*, new species.
Length 9.3-15.3 mm.

Head well produced, median length of crown from seven-tenths to more than nine-tenths interocular width, and from slightly more than four-tenths to slightly less than six-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle or slightly closer to latter, crown usually without a longitudinal fovea (indistinct in *K. resoluta* (Melichar)), lateral clypeal sutures extending onto crown and attaining ocelli or not; antennal ledges not protuberant, in lateral view with anterior margins oblique and rectilinear or convex; clypeus convex, slightly flattened medially, muscle impressions distinct, transclypeal suture obscure medially, clypellus not produced, profile of its apical portion either a continuation of contour of remainder of face or more nearly horizontal.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin slightly concave, disk weakly transversely rugose or not, without pubescence; scutellum not transversely rugose behind transverse sulcus. Forewing not broadened apically, membrane usually distinct, variable in extent, venation often obscure, texture opaque, apical margin not concave; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia (unknown for *resoluta*): Pygofer moderately to well produced, with chaetotaxy varying interspecifically, process apical, dorsoapical, or absent. Plates triangular, not extending posteriorly nearly as far as pygofer apex, usually with uniseriate macrosetae (irregularly arranged microsetae in *K. spectabilis* (Melichar)). Style extending posteriorly to a variable degree compared with connective, without a lateral lobe (exception: *K. cajana*, n. sp.), apex narrowly rounded or obliquely truncate. Connective Y-shaped with the arms widely divergent. Aedeagus quite variable interspecifically. Paraphyses present or absent, long-stalked with a pair of narrowly separated divergent rami when present.

Female (known only for *spectabilis* and *resoluta*) abdominal sternum VII deeply emarginate posteriorly. Ovipositor with second valvulae each expanded in approximately two-thirds of portion beyond basal curvature, dorsal margin of the expanded portion with numerous quadrate primary teeth of uniform size extending almost to apex, the primaries bearing small denticles, with small dorsal and posteroventral denticles before the narrowly rounded apex. Pygofer slender, slightly attenuate posterodorsally, with a few macrosetae near posterodorsal margin.

Kogigonalia, new genus, occurs in Colombia, Venezuela, French Guiana, and Peru. It is similar to *Janastana*, new genus, in appearance, but the anterior margin of the head is not as broadly rounded as in *Janastana*, the males lack the conspicuous pygofer lobe of *Janastana*, and the posterior margin of the female abdominal sternum VII is much more deeply concave than in *Janastana*.

The present interpretation of *Tacora resoluta* Melichar and *Cardioscarta spectabilis* Melichar is based on a study of the female lectotype of each.

SPECIES OF *KOGIGONALIA*

cajana, n. sp. Peru.
dietzi, n. sp. Venezuela.
enola, n. sp. F. Guiana.
resoluta (Melichar), 1926a:359 (*Tacora*). Peru. New combination.
spectabilis (Melichar), 1932a:305 (*Cardioscarta*). Colombia, Peru. New combination.
zarumoidea, n. sp. Colombia.

KEY TO SPECIES OF *KOGIGONALIA*

1. Face with at least some black marking 2
   Face without black marking 4

2. Genae yellow 3
Genae black ..... *zarumoidea*, n. sp.

3. Clypellus with at least its basal portion black
spectabilis (Melichar) (fig. 170)
Clypellus entirely yellow ..... *resoluta* (Melichar) (fig. 171)

4. Clypeus angulate in profile; male without pygofer processes, with paraphyses 5
Clypeus not so; male with an apical pygofer process, without paraphyses
cajana, n. sp., page 211

5. Forewings with large pale spots; male with a ventral unpaired process near midlength of shaft ..... *enola*, n. sp., page 211
Forewings dark, without spots; male without aedeagal processes
dietzi, n. sp., page 213

Kogigonalia zarumoidea, NEW SPECIES

FIGURE 169

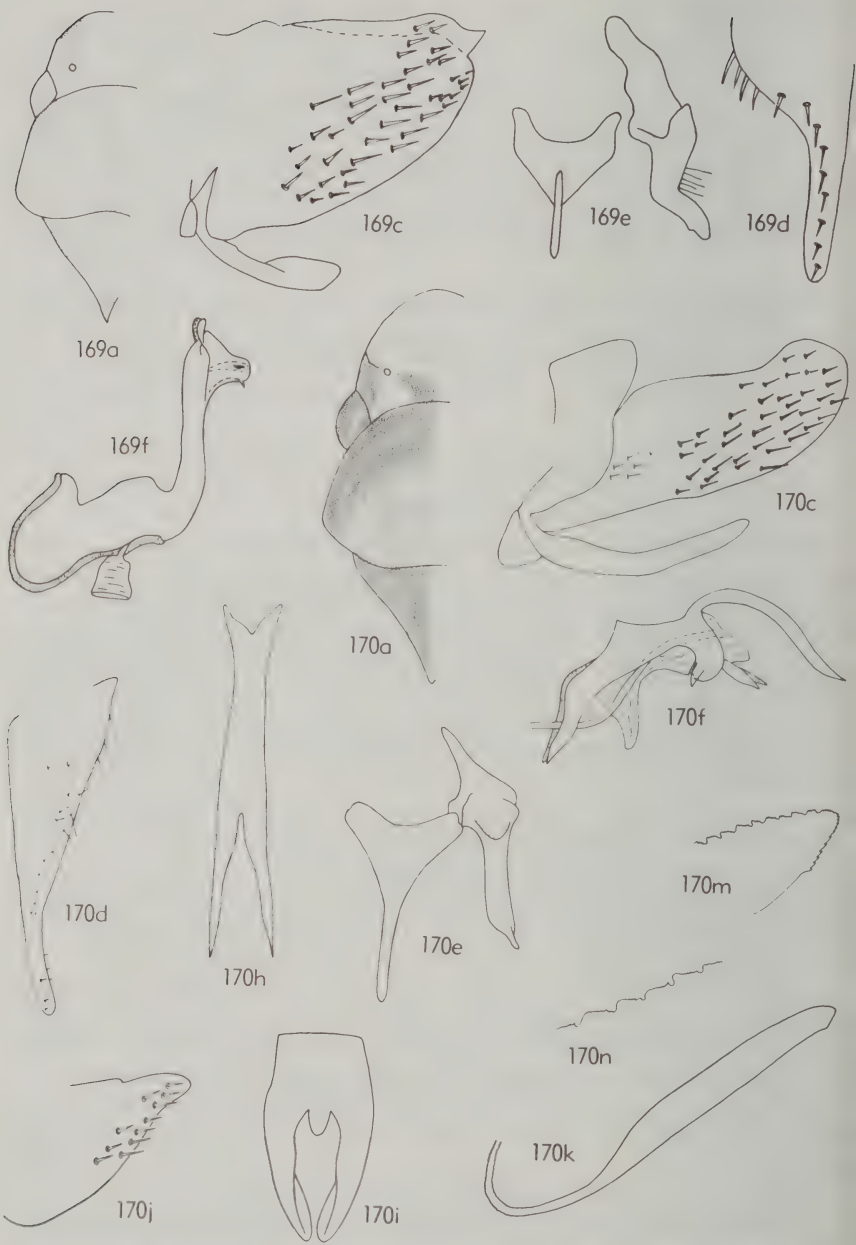
Length of male 15.3 mm. Head with median length of crown seven-tenths interocular width and slightly less than one-half transocular width, ocelli each equidistant from median line of crown and adjacent anterior eye angle, lateral clypeal sutures not attaining ocelli, clypeus in profile with a slight angular protuberance, clypellus in profile with apical portion more nearly horizontal than remainder of face. Pronotum with disk slightly rugose, scutellum slightly swollen behind transverse sulcus, forewing with base of inner anteapical cell located distal to claval apex, of other two anteapical cells more proximal than claval apex.

Male pygofer with a dorsoapical process extending beyond pygofer apex, with numerous macrosetae of varying length on posterior half; plates with uniseriate macrosetae; style extending posteriorly as far as apex of connective, without a lateral lobe, apex narrowly rounded; aedeagus with shaft slightly decurved and broadened at apex, with a pair of short dorsal anteapical processes directed posterodorsally; paraphyses absent. Female unknown.

Ground color of crown, pronotum, and scutellum dull yellow, muscle impressions on crown, pronotal areas behind each eye and a narrow median stripe on posterior half, basal angles and apex of scutellum, brown; forewing purple except apical membrane; face black except dorsomedian portion of clypeus which is concolorous with crown; propleura yellow suffused with brown, remainder of thoracic pleura brown suffused with black; legs castaneous.

Holotype male, Bogotá [Colombia] (Lindig) in RMS.

K. zarumoidea is larger than any other species in the genus and is *Zaruma*-like in appearance. The form of the pygofer process and of the aedeagus, and the lack of paraphyses serve to distinguish it from other species in the genus.



FIGURES 169, 170.—169. *Kogigonalia zarumoidea*, n. sp., holotype. 170, *K. spectabilis* (Melichar) (*a*, *c-f*, *h*, from specimen from Bogotá, Colombia; *i* from lectotype; remainder from specimen labeled "Bolivia or Chile"; *h* from dorsal view).

Kogigonalia cajana, NEW SPECIES

FIGURE 172

Length of male 13.3 mm. Head with median length of crown from seven-tenths to almost three-fourths interocular width, and less than one-half transocular width, ocelli each closer to adjacent anterior eye angle than to median line of crown, lateral clypeal sutures not attaining ocelli, clypeus in profile not angulate; clypellus in profile with lower portion not more nearly horizontal than remainder of face. Pronotum with disk obscurely rugulose, scutellum swollen behind transverse sulcus, forewing with venation obscure.

Male pygofer with a process arising at middle of posterior margin, extending dorsomedially and crossing its complement, with fewer setae than in *K. zarumoidea*, n. sp., located parallel to posterior and posteroventral margin; plates with uniseriate macrosetae; style extending posteriorly approximately as far as apex of connective, with a lateral lobe in basal half of shank, apex narrowly rounded; aedeagus curved gradually dorsad, with a serrate flange on each side at apex; paraphyses absent. Female unknown.

Ground color of crown, pronotum, and scutellum castaneous, a broad median line on crown, a fusiform median marking on pronotal disk and an oblique mark on each side on posterior half extending to or near humeral margin, and a broad median stripe on posterior three-fourths of scutellum, yellow tinged with orange; forewing opaque, dark brown; face castaneous, with or without (holotype) a median yellow stripe on clypeus; thoracic pleura castaneous with some yellow suffusion; legs brown except paler apical portions of femora and basal portion of tibiae.

Holotype (MMB) and one additional male (RMS), Callanga, Peru.

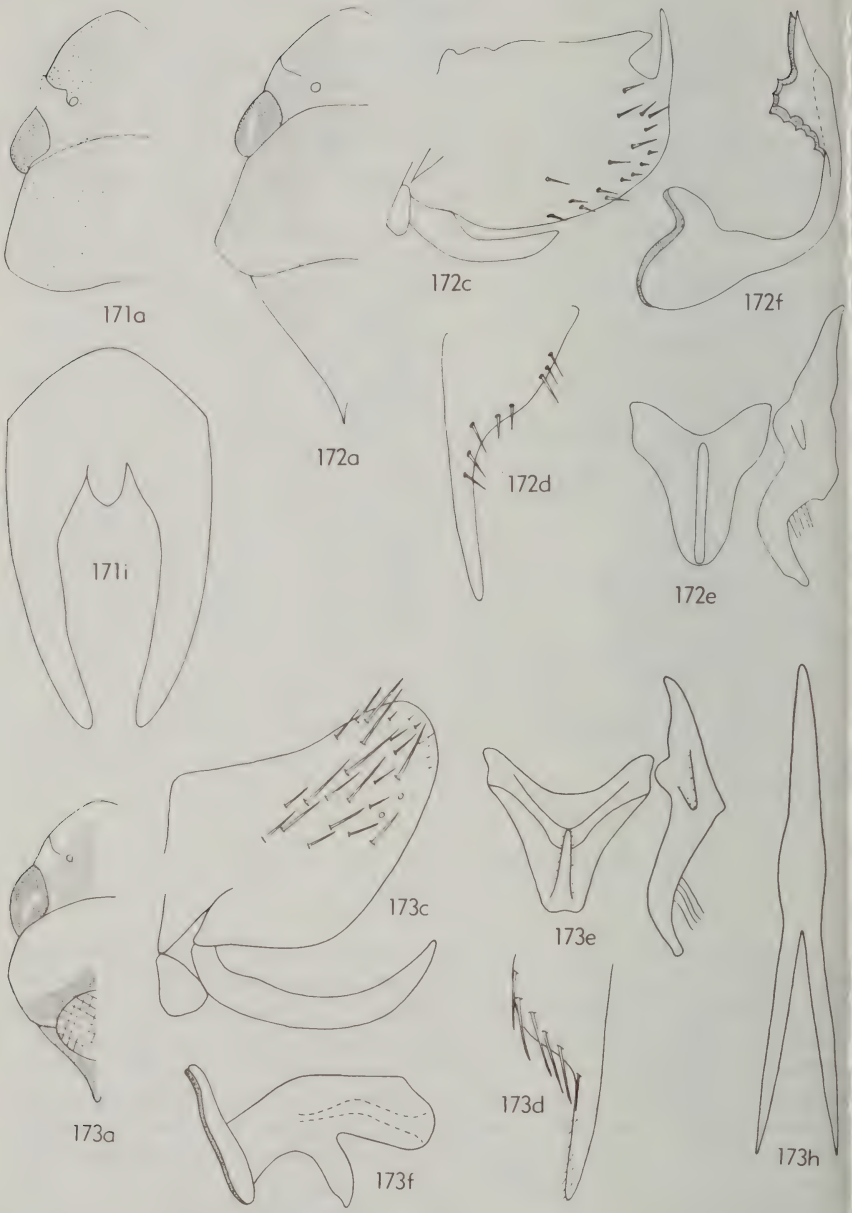
The distinctive markings of the anterior dorsum, and the form of the male pygofer and aedeagus serve to distinguish *cajana*, n. sp., from other species of *Kogigonalia*.

Kogigonalia enola, NEW SPECIES

FIGURE 173

Length of male 9.3 mm. Head with median length of crown more than nine-tenths interocular width, and slightly more than one-half transocular width, ocelli each equidistant from median line of crown and adjacent anterior eye angle, lateral clypeal sutures attaining ocelli, clypeus in profile without an angular protuberance (slightly indented as result of mechanical (?) damage), clypellus in profile with apical portion not more nearly horizontal than remainder of face. Pronotum with disk not rugose, scutellum not swollen behind transverse sulcus, forewing with base of inner anteapical cell opposite claval apex, of other anteapical cells more proximal.

Male pygofer with dorsoapical margin regularly convex, without a process, with a group of macrosetae on posterodorsal portion; plates with uniseriate macrosetae; style extending posteriorly slightly farther than apex of connective, with a lateral lobe near base of shank, apex narrowly rounded, aedeagus short, slightly decurved, with an unpaired ventral process extending ventrad



FIGURES 171-173.—171, *Kogigonalia resoluta* (Melichar), lectotype. 172, *K. cajana*, n. sp., holotype. 173, *K. enola*, n. sp., holotype (*h* from dorsal view).

near midlength of shaft; paraphyses with narrow stalk as long as rami which are tapered and acute and gradually, slightly divergent. Female unknown.

Crown rich brown, suffused with black next each eye, a spot at apex and a spot on each antennal ledge, dull yellow; pronotum bright yellow except a transverse purple band at posterior margin, the band with two anterior angles; forewing with humeral margin and claval commissure purple and purple bands extending laterad from these to costal margin and delimiting three large yellow spots; the anteriormost extending laterad from basal half of clavus, the middle one extending laterad from apical one-fourth of clavus, the most posterior extending across anteapical cells, all three of the spots reaching costal margin; face, propleura, and legs dull yellow tinged with orange.

Holotype male, St. Jean, French Guiana, from the collection of William Schaus (USNM).

K. enola, new species, is distinctive in color in the genus *Kogigonalia*. The unpaired ventral shaft process of the aedeagus will also distinguish it from other species.

Kogigonalia dietzi, NEW SPECIES

FIGURE 174

Length of male 10.3-11.1 mm. Head with median length of crown from seven-tenths to almost eight-tenths interocular width, and from slightly more than four-tenths to almost one-half transocular width, ocelli each slightly closer to adjacent anterior eye angle than to median line of crown, lateral clypeal sutures attaining ocelli, clypeus in profile with an angular protuberance, lower portion of clypeus and all of clypellus with profile more nearly

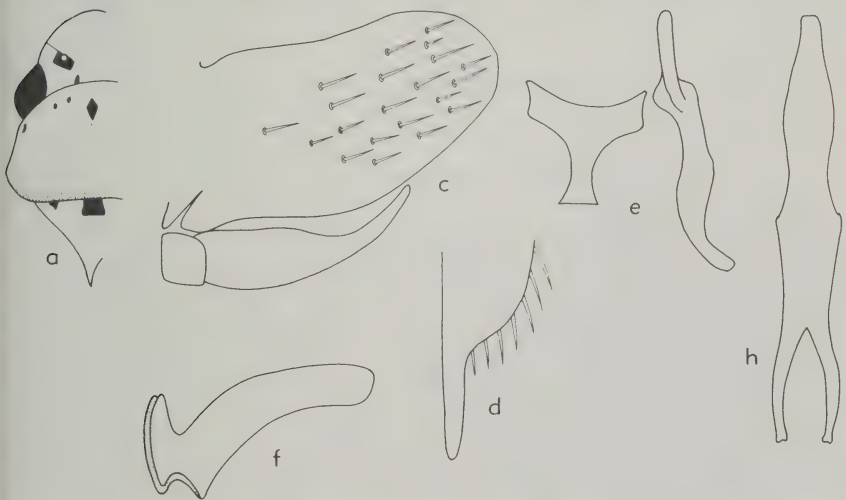


FIGURE 174.—*Kogigonalia dietzi*, n. sp. (*a* from holotype; remainder from specimen from Bolivar, Venezuela; *h* from ventral view).

horizontal than portion of clypeus above the angularity. Pronotum not sculptured, scutellum not swollen behind transverse sulcus, forewing with bases of all anteapical cells proximal to claval apex.

Male pygofer with posterior margin regularly convex, without processes, with numerous macrosetae on posterior two-thirds; plates with uniseriate macrosetae; style extending posteriorly beyond apex of connective, without a lateral lobe; aedeagus with shaft slightly decurved, without processes; paraphyses with stalk much longer than rami which are truncate apically and subparallel in their apical portions.

Crown amber, with at least a small black spot on posterior margin behind each ocellus, often (holotype) with the ocelli black-bordered, and in some specimens with a single median or a pair of near-median spots before ocelli; pronotum with anterior marginal area concolorous with crown, irregularly marked with a few black spots, remainder purple; scutellum amber, with a pair of small, laterobasal spots and in some specimens (holotype) with a median basal black spot. Forewing opaque, gray with a dull orange costal stripe curving mesad apically to form apical border of gray portion; bases of anteapical cells dark purple or not (holotype); face yellow (holotype) to gray with poorly delimited and inconstant black markings; thoracic pleura pruinose; legs yellow to gray, in some specimens with apical portions darkened.

Holotype and one additional male, Ptari-tepui, 30 mi. North of Kavanayen, Venezuela 1,800 m., August 14-16, 1970 (R. E. Dietz IV); one male, same data except August 17-19, 1970; seven males, Bolivar, Kavanayen, Venezuela 1,000 m., August 8, 1970 (R. E. Dietz IV) (USNM).

K. dietzi, n. sp., may be distinguished from other species of *Kogigonalia* by the color pattern, the profile of the face, and the form of the aedeagus.

I take pleasure in naming this species for the collector, R. E. Dietz IV.

26. JANASTANA, NEW GENUS

FIGURES 175-178

Type-species: *Tettigonia distinguenda* Fowler.

Length 10.5-11.3 mm.

Head well produced, median length of crown varying from six-tenths to slightly less than eight-tenths interocular width and from four-tenths to one-half transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior edges oblique and convex or rectilinear; clypeus convex medially, muscle impressions distinct or not, transclypeal suture obscure medially, clypellus not strongly produced but in profile with its lower portion more nearly horizontal than its upper portion.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete or nearly so, posterior margin varying from convex to slightly concave, disk without sculpturing, without pubescence; scutellum not striate behind transverse sulcus. Forewing with a membrane, veins not very distinct, with four apical cells of which base of fourth is more proximal than base of third, without anteapical plexus of veins, texture translucent, except for dark markings, and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced posteriorly, with a distinct dorsal process or lobe, posteroventral lobe bearing non-seriate macrosetae. Plates triangular, abruptly narrowed near midlength, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae on basal half. Style without preapical lobe, not extending posteriorly beyond apex of connective. Connective broad, variable in shape interspecifically. Paraphyses absent. Aedeagus without or with weak dorsal apodemes, with a pair of basiventral atrial processes, shaft curved slightly or strongly ventrad, with a pair of processes arising beyond base and varying interspecifically.

Female abdominal sternum VII elongate, not extremely narrow, apex with a median emargination delimited by a lobe on each side. Dorsal membrane of genital chamber with a conspicuous median plate. Ovipositor with valvulae II each expanded in slightly more than apical half, the width of the expanded

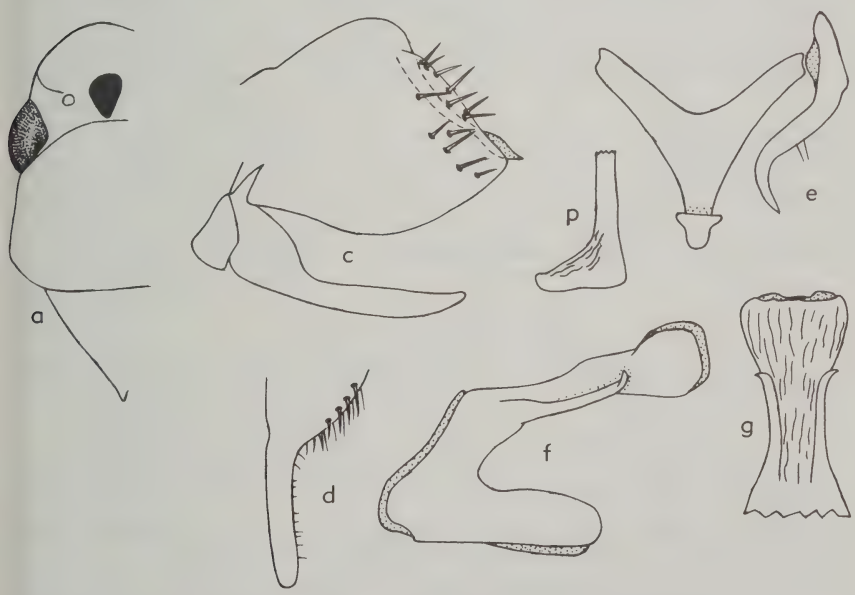


FIGURE 175.—*Janastana bilineata* (Fowler), lectotype (only aedeagal shaft shown in *g*): *p*, Apex of connective from lateral view.

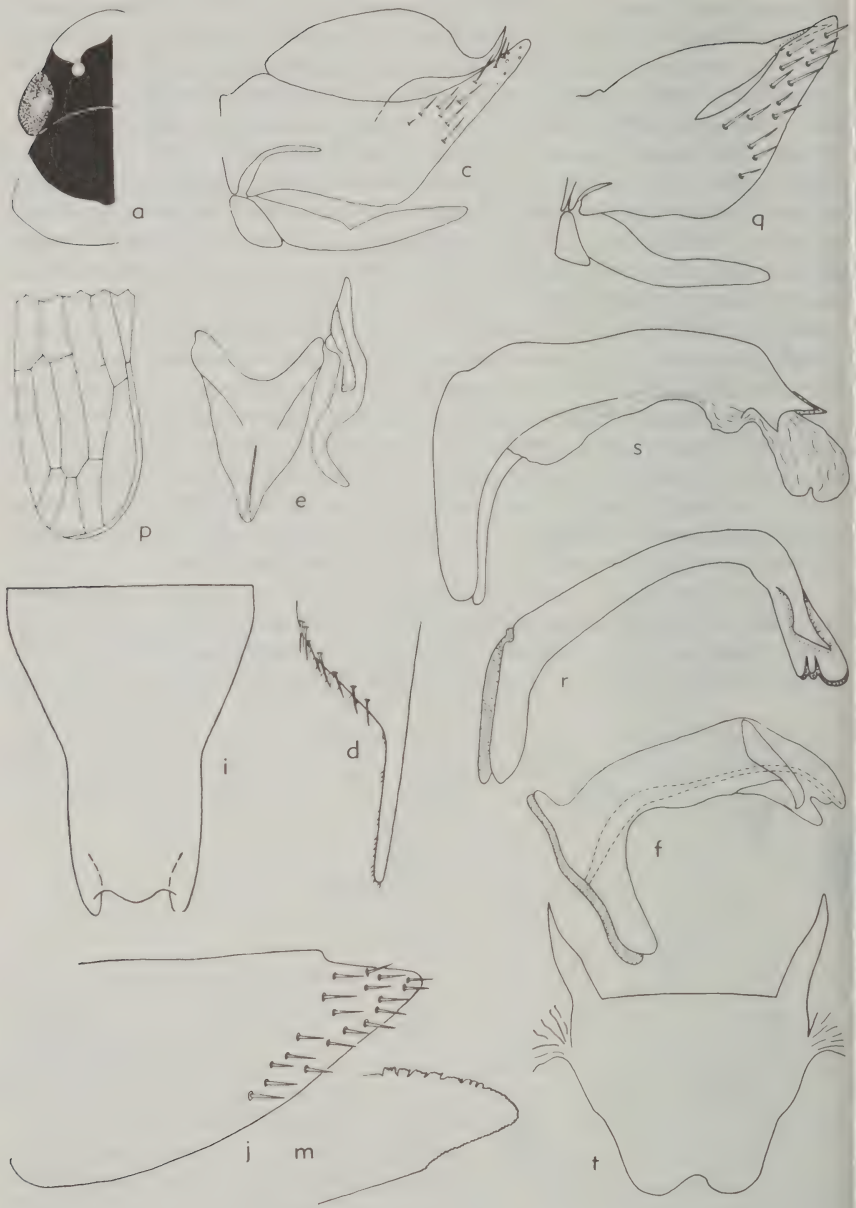


FIGURE 176.—*Janastana distinguenda* (Fowler) (*a, c-f, p,* from specimen from Costa Rica; *q, r,* from Cristalina, Colombia; *s* from Balzapamba, Ecuador; remainder from Colombia): *p,* Apex of forewing; *q,* male pygofer from lateral view; *r, s,* aedeagus from lateral view; *t,* dorsal sclerite of genital chamber.

portion uniform and with teeth near base of expanded portion not much larger than succeeding teeth which become gradually progressively smaller apically and ending before apex; apicoventral margin almost a continuation of ventral margin; apex acute. Pygofer subangular at apex, with macrosetae occurring anteapically.

Species of *Janastana*, new genus, are yellow or orange with dorsal transverse black bands of varying width.

Specimens belonging to *Janastana*, new genus, have been examined from Mexico, Costa Rica, Panama, Colombia, and Ecuador. The genus is similar to *Cardioscarta* Melichar in many respects, but differs in the males in that the pygofer bears either a dorsal process or lobe, in that the aedeagal processes arise distal to the aedeagal base, in that paraphyses are absent, and in the uniseriate macrosetae of the male plates; in the female the apices valvulae II of the ovipositor are more acute, with the apicoventral margin almost a rectilinear continuation of the ventral margin. *Janastana* is also related to *Poeciloscarta* Stål from which it may be separated by the male pygofer which is longer in *Poeciloscarta* and without lobes or processes, and by the plates which are narrowed closer to the apex in *Poeciloscarta* and less abruptly. *Janastana* is also close to *Kogigonalia*, new genus, in the discussion of which distinguishing characters are treated.

My interpretation of *Tettigonia bilineata* Fowler is based on a study of the male lectotype of which the genitalia are illustrated here (fig. 175).

The present interpretation of *Tettigonia distinguenda* Fowler is based on a comparison of the female lectotype with the original illustration and subsequent comparison of other specimens with the same illustration. Dissection of males of some of these revealed genital structures which I think are intraspecific variations of typical *Tettigonia melliguttula* Breddin as exemplified by a dissected male topotype from ZIMH. I also studied the female lectotype of *melliguttula* from DEI.

The present interpretation of *Cardioscarta erupta* Melichar is based on drawings of the lectotype and on subsequent dissections of males agreeing with the drawings. My attempt to clear the genitalia of the teneral lectotype had resulted in ruining the genital structures in the lectotype.

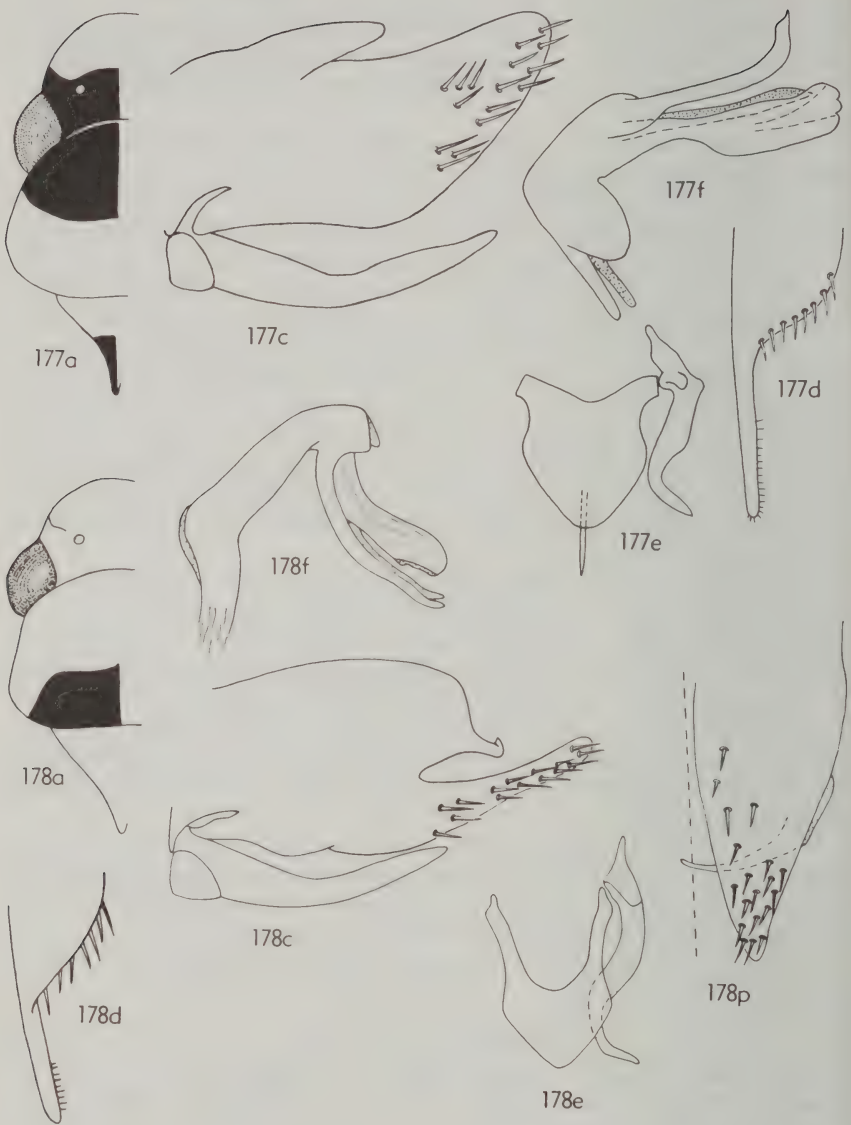
The present interpretation of *Tettigonia taeniata* Fowler is based on a dissection of the male lectotype.

SPECIES OF *JANASTANA*

bilineata (Fowler), 1900a:257 (*Tettigonia*). Mexico. New combination.
distinguenda (Fowler), 1900a:257 (*Tettigonia*). Costa Rica, Panama, Colombia, Ecuador. New combination.
melliguttula (Breddin), 1901e:91 (*Tettigonia*). New synonymy.
erupta (Melichar), 1932a:300 (*Cardioscarta*). Costa Rica. New combination.
taeniata (Fowler), 1900a:257 (*Tettigonia*). Costa Rica, Panama. New combination.

KEY TO SPECIES OF *JANASTANA*

1. Forewings in rest position traversed by two very broad black stripes 2
   Forewings not so marked, transverse stripes narrow when present
   bilineata (Fowler) (fig. 175)



FIGURES 177, 178.—177, *Janastana erupta* (Melichar), from specimens from Costa Rica. 178, *J. taeniata* (Fowler) (*a* from specimen compared with lectotype; remainder from lectotype): *p*, Male pygofer apex from ventral view.

2. Forewing with outer three apical cells mostly black, narrowly pale apically ..... *distinguenda* (Fowler) (fig. 176)
   Forewing with outer three apical cells orange-yellow, not marked with black 3

3. With a third broad transverse black band including posterior portion of crown and anterior portion of pronotum; anterior tibiae pale yellow or orange ..... *erupta* (Melichar) (fig. 177)
   With only two transverse black bands neither of which includes posterior margin of crown; anterior tibiae black ..... *taeniata* (Fowler) (fig. 178)

27. XENOGONALIA, NEW GENUS

FIGURE 179

Type-species: *Cicadella longicornis* Osborn (1926b:183).

Length of male 14.9-15.0 mm.

Head well produced, truncate apically in dorsal view, median length of crown slightly less than six-tenths interocular width and from four-tenths to slightly more than four-tenths transocular width, anterolateral margins broadly convex, without a carina at transition from crown to face, ocelli in line with anterior eye angles, each equidistant from median line and adjacent anterior eye angle, crown with a transverse concavity before ocelli, surface without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges slightly protuberant, in lateral view with anterior margins oblique and convex; clypeus strongly convex, slightly flattened

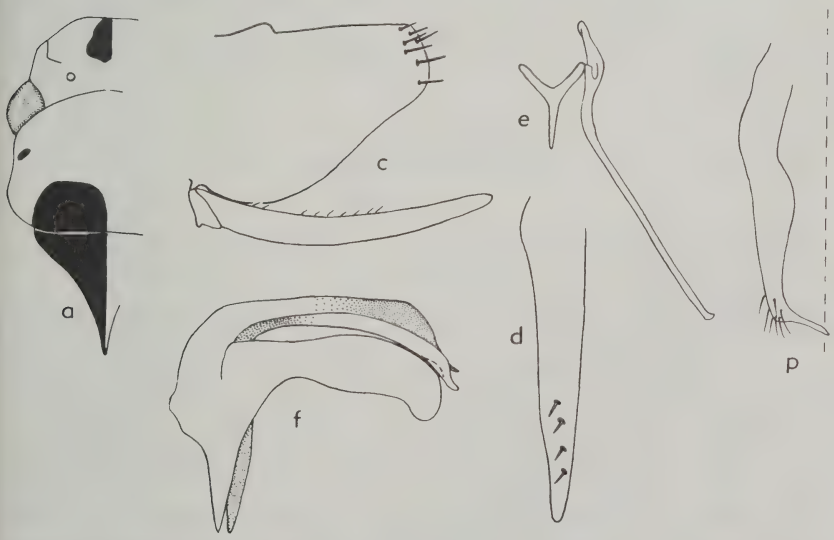


FIGURE 179.—*Xenogonalia longicornis* (Osborn), holotype; *p*, Male pygofer apex, right side, from ventral view.

medially, muscle impressions not very distinct, transclypeal suture obsolete medially, clypellus tumid at midlength, otherwise with its contour continuing profile of clypeus, not pubescent.

Thorax with pronotal width slightly greater than transocular width of head, lateral pronotal margins convergent anteriorly, dorsopleural carinae oblique and incomplete, posterior margin very slightly concave, disk elevated and without sculpturing; scutellum not striate behind transverse sulcus. Forewing with membrane including apical portions of all apical cells, with three closed anteapical cells of which bases of outer two are proximal to claval apex, the innermost distal to claval apex, without an anteapical plexus of veins, texture coriaceous before membrane and with indistinct fine transverse rugae. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer well produced, subtruncate apically, with a narrow acute dorsoapical process extending mesad, with a few macrosetae near base of process. Plates elongate triangular, each with a short row of setae. Style very long and slender, slightly expanded at apex, without a lateral lobe. Connective Y-shaped with arms and stem approximately of equal length, stem not extending posteriorly as far as midlength of style. Aedeagus slightly decurved with a pair of processes arising basidorsally, extending parallel to shaft to its apex. Paraphyses absent.

Xenogonalia is known only from the type-species which is orange anteriorly, with an apical coronal black spot, and black wings. *X. longicornis* (Osborn) is known from the eastern slope of the Andes in Peru and from the Purús River valley in Brazil. I have studied the holotype of this species.

Xenogonalia is placed near *Cardioscarta* Melichar and *Poeciloscarta* Stål in this work because of similarities in the male genitalia to some representatives of those genera (e.g. *Poeciloscarta* of the *cardinalis* complex, and *Cardioscarta quadrifasciata* (L)).

28. OEOGONALIA, NEW GENUS

FIGURE 180

Type-species: *Tettigonia fossulata* Signoret (1855b:237).

Length of male 8.4 mm, of female 9.5 mm.

Head moderately produced, median length of crown approximately six-tenths interocular width and slightly less than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, disk of crown flattened between ocelli, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges slightly protuberant, in lateral view with anterior margins oblique and rectilinear; clypeus convex medially, muscle impressions distinct, transclypeal suture obscure medially, clypellus with profile a continuation of contour of lower portion of clypeus.

Thorax with pronotal width approximately equal to transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin shallowly concave, disk weakly rugose or not, without pubescence; scutellum not or only obscurely rugulose behind transverse sulcus. Forewing with apical cells membranous, veins not elevated, not very distinct, with four apical cells of which base of fourth is slightly more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, broadly and regularly convex posterodorsally, with macrosetae on posterior half, processes absent. Plates triangular, gradually tapering, not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae. Style short, shank bisinuate, without a preapical lobe. Connective short, T-shaped. Aedeagus short, symmetrical, without processes, membranous in apical half. Paraphysis unpaired, symmetrical, elongate, slender, located in median plane.

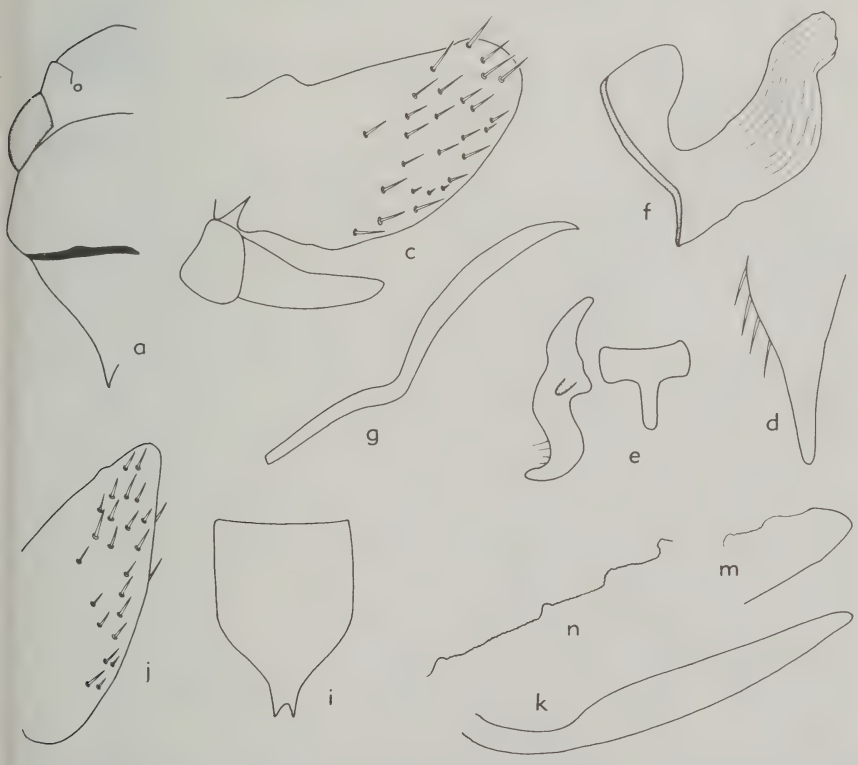


FIGURE 180.—*Oeogonalia fossulata* (Signoret) (from specimens from Brazil; *g* from lateral view).

Female abdominal sternum VII with posterior margin tapering to slightly notched apex. Ovipositor with second valvulae each toothed on dorsal margin beyond basal curvature, the teeth broad, sloping, and with minute secondaries, apex rounded, without anteapical dorsal or posteroventral denticles, ventral margin convex, basal curvature slight. Pygofer narrowly rounded posterodorsally, with a broad group of macrosetae located parallel to posteroventral margin.

Oeogonalia, new genus, is known only from the type-species from Colombia and Brazil, a dull orange to tan species. I have placed it near *Poeciloscarta* Stål, but it is less similar than the other genera discussed in the treatment of that genus. The form of the second valvulae of the ovipositor differs from all of the genera discussed there.

I have seen a male and a female, from MHNP, labeled "Aulacizes fossulata". Both agree with Signoret's original illustration (1855b, plate 12, fig. 14). I have not seen a specimen (Spinola collection) eligible to be lectotype.

29. Genus EXOGONIA Melichar

Figures 181-184

Exogonia Melichar, 1926a:342. Type-species: *Tettigonia assimilis* Signoret, by subsequent designation of China, 1938d:183.

Length 8.3-12.0 mm.

Head slightly to moderately produced, median length of crown varying from more than four-tenths to almost two-thirds interocular width, and from three-tenths to approximately four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located in line with anterior eye angles, each approximately equidistant from latter and median line of crown or slightly closer to adjacent anterior eye angle, crown usually with an anteapical concavity before ocelli (very strong in *Exogonia assimilis* (Signoret), absent in some specimens of *E. semivitta* (Walker)), surface without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and varying from convex (usually) to rectilinear or concave (*semivitta*); clypeus varying interspecifically from slightly to strongly flattened medially, muscle impressions distinct or not, transclypeal suture obsolete medially, clypellus with profile not angulate, continuing contour of clypeus (usually) or with its lower portion more nearly horizontal (*assimilis*), not pubescent.

Thorax with pronotal width varying interspecifically compared with transocular width of head, lateral margins parallel or convergent anteriorly, dorsopleural carinae complete and oblique, posterior margin concave, disk transversely rugose; scutellum not striate behind transverse sulcus. Forewing with membrane varying interspecifically from sharply delimited to indistinct at its base, variable interspecifically in extent when present, with three closed anteapical cells, their bases more proximal than claval apex, with four apical

cells of which base of fourth may be more proximal or more distal than base of third, without an anteapical plexus of veins, texture coriaceous except apically, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, posterior margin convex, with numerous macrosetae on posterior half. Plates not extending posteriorly nearly as far as pygofer apex, gradually tapered, with macrosetae uniseriate, often few in number. Style variable interspecifically as to its posterior extent compared with apex of connective, with lobe near midlength. Connective broadly to narrowly Y-shaped. Aedeagus broadest in apical half, longer than in *Amblyscartidia*, new genus, and not as broad. Paraphyses present, stalked, symmetrical, some species with two pairs of rami.

Female abdominal sternum VII with posterior margin concave. Dorsal membrane of genital chamber with or without sclerites, small when present.

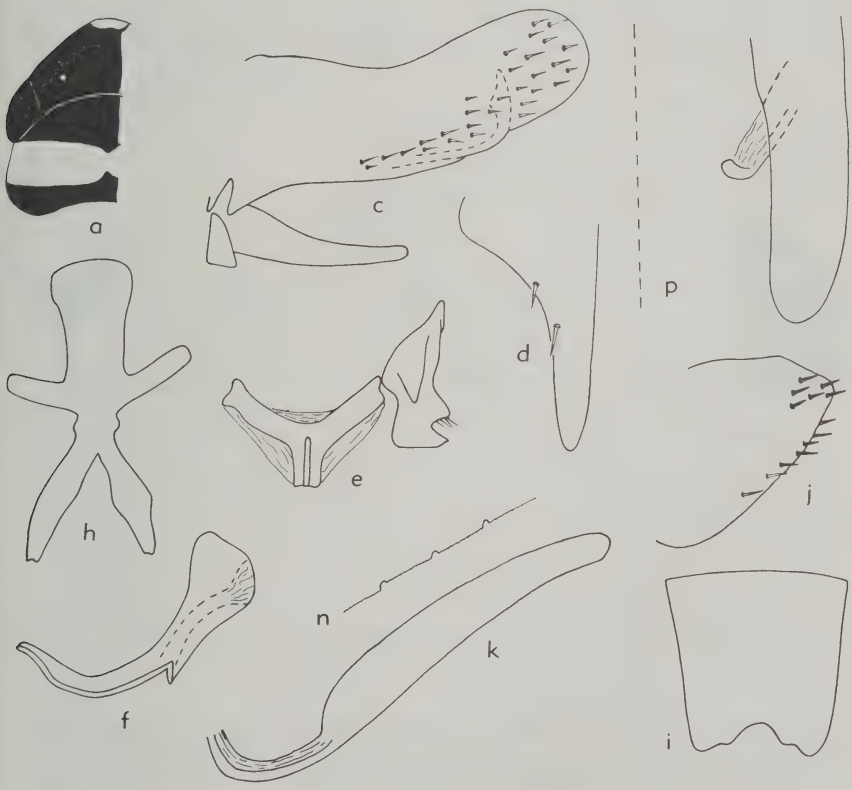
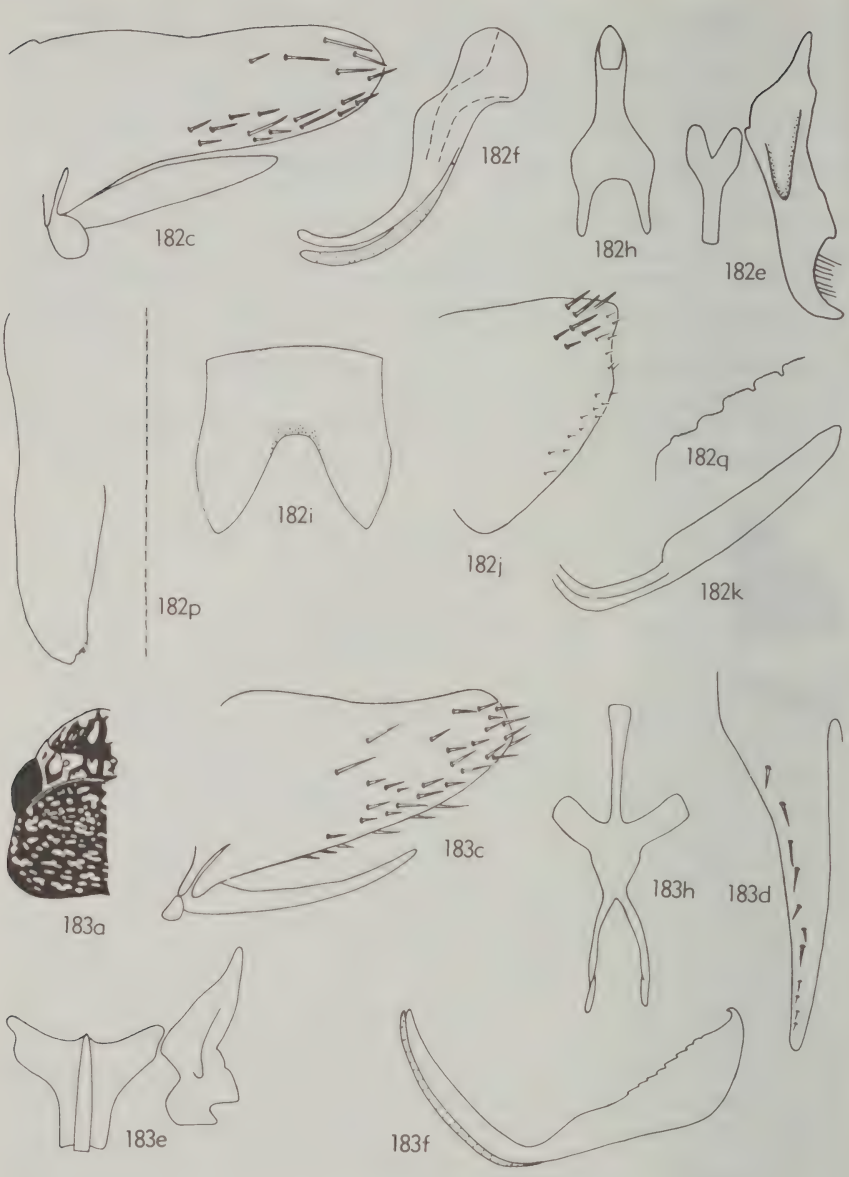


FIGURE 181.—*Exogonia assimilis* (Signoret) (*i* from specimen from São Paulo, Brazil, *j, k, n,* from Bahia, Brazil; remainder from lectotype; *h* from ventral view): *p,* Male pygofer apex, left side, from ventral view.



FIGURES 182, 183.—182, *Exogonia leucampix* (Signoret) (*i* from specimen from São Paulo, Brazil, *j*, *k*, *q*, from southern Brazil, remainder from Nova Teutonia, Brazil; *h* from ventral view): *p*, Male pygofer apex, right side, from ventral view; *q*, teeth near base of second valvula. 183, *E. hyalinosparsa* (Melichar) (*a* from specimen from Espírito Santo, Brazil; remainder from lectotype; *h* from dorsal view).

Ovipositor with second valvulae varying interspecifically, each with the broad toothed portion extending from near basal curvature to apex, the teeth more uniform throughout length than in *Amblyscartidia*, apex convex, ventral margins of valvulae varying interspecifically from convex to concave. Pygofer with a few larger macrosetae in a group near apex and a few macrosetae or microsetae parallel to posteroventral margin.

Exogonia Melichar is similar to *Amblyscartidia* but differs in that the head is always more strongly produced than in *Amblyscartidia*, the pygofer and aedeagus are longer in the males, the pygofer of the female has fewer setae, and the teeth of the second valvulae of the ovipositor, although variable, are never as in the constant pattern found in *Amblyscartidia*.

Species of *Exogonia* Melichar are varied in color. The genus is known only from southern Brazil.

My identification of the nominal species is based on an examination of the holotype of *Tettigonia semivitta* Walker, and the lectotypes of the others.

SPECIES OF *EXOGONIA*

assimilis (Signoret), 1853b:340 (*Tettigonia*). S. Brazil.
hyalinosparsa (Melichar), 1932a:316 (*Cardioscarta*). S. Brazil. New combination.

FIGURE 184.—*Exogonia semivitta* (Walker) (from specimens from Bahia, Brazil; *h* from dorsal view): *p*, Teeth near base of second valvula of ovipositor.

leucampix (Signoret), 1853b:340 (*Tettigonia*). S. Brazil.
semivitta (Walker), 1851b:752 (*Tettigonia*). S. Brazil. New combination.
serena (Melichar), 1932a:301 (*Cardioscarta*). New synonymy.
incarnatula (Melichar), 1932a:311 (*Cardioscarta*). New synonymy.

KEY TO SPECIES OF *EXOGONIA*

1. Crown and pronotum black, with a broad transverse pale stripe on pronotum 2
   Crown and pronotum not so marked 3
2. Male with style apex broadly truncate, style not extending posteriorly beyond apex of connective; female with abdominal sternum VII shallowly concave at apex ..... *assimilis* (Signoret) (fig. 181)
   Male with style narrowly rounded at apex, extending posteriorly well beyond apex of connective; female with abdominal sternum VII more deeply concave ..... *leucampix* (Signoret) (fig. 182)
3. Crown and pronotum black with numerous small yellow spots and vermiculations ..... *hyalinosparsa* (Melichar) (fig 183)
   Crown and pronotum dull orange, with black markings *semivitta* (Walker) (fig. 184)

30. AMBLYSCARTIDIA, NEW GENUS

FIGURES 185-193

Type-species: *Tettigonia albofasciata* Walker.
Length 6.7-11.1 mm.

Head not produced, median length of crown varying from slightly more than four-tenths to two-thirds interocular width and from one-fourth to approximately four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or behind a line between anterior eye angles, each approximately equidistant from latter and median line of crown or slightly closer to median line (*amissa*, n. sp.), crown usually without a distinct transverse concavity between ocelli, with a narrow shallow median anteapical concavity, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus slightly flattened medially, muscle impressions distinct or not, transclypeal suture obsolete medially, clypellus with profile continuing contour of clypeus or more nearly horizontal (varying interspecifically), not pubescent.

Thorax with pronotal width varying interspecifically compared with transocular width of head, lateral margins parallel or convergent anteriorly (varying interspecifically), dorsopleural carinae complete or not (varying interspecifically), posterior margin varying from weakly concave to occasionally slightly convex, disk almost always without sculpturing; scutellum not striate behind transverse sulcus. Forewing with membrane sharply delimited (*A. pardaliota*, n. sp.) or not but with apical portion membranous, with three

closed anteapical cells, their bases more proximal than claval apex, with four apical cells of which base of fourth is more proximal than base of third (except in *amissa*), without an anteapical plexus of veins, texture coriaceous except apically, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of setae on plantar surface.

Male genitalia: Pygofer strongly produced, posterior margin convex, with numerous macrosetae on posterior half, without processes. Plates short, not extending posteriorly nearly as far as pygofer apex, narrowed near midlength, with uniseriate macrosetae. Style with posterior extent compared to connective variable interspecifically, usually with a lobe near midlength (preapical in *A. duodecimpunctata* (Germar)). Connective variable. Paraphyses present, symmetrical. Aedeagus short, much broader apically than at base, with a dorsoapical lobe developed to a degree that varies interspecifically, occasionally with apicoventral portion angular or with short processes.

Female abdominal sternum VII varying interspecifically from slightly to moderately produced, apical margin from regularly convex (acute in *amissa*, n. sp.) to transverse and slightly emarginate. Dorsal membrane of genital chamber uniformly sclerotized, without sclerites. Ovipositor with teeth throughout dorsal margin of second valvula beyond basal curvature, the more basal teeth convexly rounded, teeth near midlength very broad, those near apex narrower, apex usually truncate, ventral margin of valvula usually convex. Pygofer with numerous macrosetae on apical half, or in a narrow group parallel to apical and apicoventral margin.

Specimens of *Amblyscartidia* are red, brown, or (most commonly) black, and marked with yellow or gray spots (exception: *A. juliacoides*, n. sp., which has wings marked mostly with longitudinal lines.) All of the species except *amissa* have a pale transverse arc extending up the antennal ledges and at least partly across the disk of the crown.

Amblyscartidia, new genus, is known only from Venezuela and southern Brazil. *Amblyscartidia* is similar in habitus, and in some characteristics of the male genitalia (for example the numerous setae of the pygofer, the form of the style and connective, the presence of paraphyses, and the broadened aedeagal shaft) to *Dilobopterus* Signoret where similar conditions are found among the large number of species of the latter. The development of the dorsal lobe of the aedeagus occurs also in *Dilobopterus* (although it occurs also in other genera not considered closely related). The form of the second valvulae of *Amblyscartidia* is also compatible with the suggested relationship. *Amblyscartidia* differs from *Dilobopterus* in its symmetrical paraphyses, the broader hindwings, and in that its posterior meron is concealed by the forewings in repose. *Amblyscartidia* is closely related to *Paratubana*, new genus (*q. v.* for distinguishing features).

My interpretation of *Tettigonia albofasciata* Walker is based on a study of the male holotype. I compared a male with the female holotype of *T. auriplena* Walker, and have identified *auriplena* in the sense of these two specimens. *T. argentigutta* is identified here in the sense of the female holotype. The genitalia

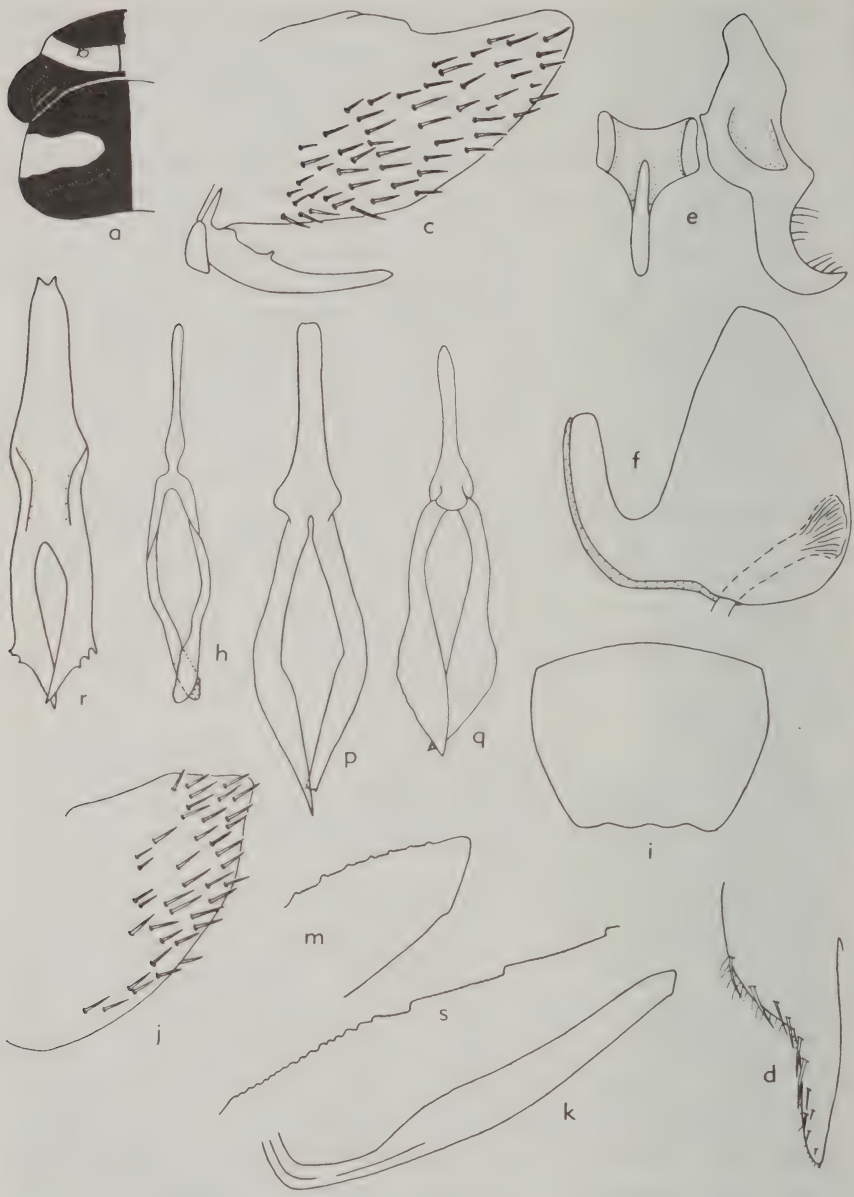


FIGURE 185.—*Amblyscartidia albofasciata* (Walker) (*a*, lectotype; *c*, *e*, *f*, *h*, from specimen from Rio de Janeiro, compared with lectotype of *Tettigonia auriplena* Walker; *h* from dorsal view; *d*, *p*, from Santa Catharina, Brazil; *q* from southern Brazil; *r* from Campos de Jordão, Brazil; *i*, *k*, *m*, *s*, from Minas Gerais, Brazil): *p*, *q*, *r*, Paraphyses; *s*, basalmost teeth of second valvula of ovipositor.

of the male holotype of *T. sedecimguttata* Taschenberg are almost identical to those of the lectotype of *T. auriplena*. I have studied the female holotype of *Cicadella sulfureoguttata* Osborn.

I have not seen type specimens of *Tettigonia duodecimpunctata* Germar. The present interpretation agrees with Signoret's (1853b, pl. 9, fig. 4) illustration.

Blanchard's (1840a:190) description of *Tettigonia elegantissima* and Signoret's (1853b, pl. 9, fig. 5) illustration both apply to a form with genitalia like *Amblyscartidia albofasciata* (Walker), but otherwise most closely resembling *A. incredibilis*, n. sp., which has been commonly misdetermined as *elegantissima*. I retain *elegantissima* because it looks distinct from *albofasciata*.

I select, as lectotype, a male specimen of *Tettigonia luteolinea* Taschenberg, with the label: "Nov./Frib." on the same pin, and a separate label accompanying this and another specimen and stating "luteolinea-/ ta m./Bras. Br.". I have placed a lectotype label on this specimen from HS.

SPECIES OF *AMBLYSCARTIDIA*

albofasciata (Walker), 1851b:756 (*Tettigonia*). S. Brazil. New combination.
auriplena (Walker), 1858b:214 (*Tettigonia*). New synonymy.
argentigutta (Walker), 1858b:215 (*Tettigonia*). New synonymy.
sedecimguttata (Taschenberg), 1884a:439 (*Tettigonia*). New synonymy.
sulfureoguttata (Osborn), 1926b:197 (*Cicadella*). New synonymy.
amissa, n. sp. Venezuela (?).
dariona, n. sp. S. Brazil.
duodecimpunctata (Germar), 1821a:66 (*Tettigonia*). S. Brazil. New combination.
elegantissima (Blanchard), 1840a:190 (*Tettigonia*). S. Brazil. New combination.
feminae, n. sp. S. Brazil.
incredibilis, n. sp. S. Brazil.
juliacoides, n. sp. S. Brazil.
luteolinea (Taschenberg), 1884a:437 (*Tettigonia*). Brazil. New combination.
pardaliota, n. sp. S. Brazil.

KEY TO MALES OF *AMBLYSCARTIDIA*

1. Paraphyses with stalk much longer than rami
incredibilis, n. sp., page 230
Paraphyses with stalk shorter than rami 2

2. Head without a pale transverse arc extending up antennal ledges and across or partly across disk of crown; aedeagus with ventral anteapical paired processes ..... *amissa*, n. sp., page 235
Head with a pale transverse arc extending up antennal ledges and across or partly across disk of crown; aedeagus without such processes 3

3. Ground color of forewings brown; paraphyses with rami broad and truncate apically ..... *feminae*, n. sp., page 238
Ground color of forewings red or black; paraphyses tapered apically or rounded 4

4. Style extending posteriorly much beyond apex of connective
luteolinea (Taschenberg) (fig. 185)
Style not or scarcely exceeding apex of connective 5

5. Pronotum with width greater than transocular width of head 6
Pronotum width less than transocular width of head 8

6. Markings of pronotum and forewings consisting of yellow spots on a red background; style rounded at apex; paraphyses irregularly dentate *pardaliota*, n. sp., page 231
Markings of pronotum and forewings consisting of round yellow or red spots on black background; style truncate at apex; paraphyses not dentate 7

7. Crown with a spot or an approximate pair of spots at middle of posterior margin; paraphyses broadest apically ..... *dariona*, n. sp., page 233
Crown without such a spot or spots; paraphyses broadest anteapically *duodecimpunctata* (Germar) (fig. 192)

8. Forewings with longitudinal linear pale markings on clavus and corium *juliacoides*, n. sp., page 237
Forewings with spots or bands short and transverse when present 9

9. Size smaller, length 8.0-8.4 mm; pale spots of forewing small, with only one transverse pale band near apex of each wing, or if two present, then very narrow ..... *elegantissima* (Blanchard)
Size larger, length 8.9-9.5 mm; pale spots of forewings large, with two broad transverse pale bands near apex of each wing *albofasciata* (Walker) (fig. 185)

Amblyscartidia incredibilis, NEW SPECIES

FIGURE 186, PAGE 232

Length of male 9.6-10.4 mm, of female 10.4-11.1 mm. Head with median length of crown varying from more than four-tenths to less than six-tenths interocular width, and from three-tenths to less than four-tenths transocular width, clypeus with muscle impressions not distinct, clypellus in profile continuing contour of face. Pronotum with width less than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, posterior margin convex or concave; forewing with membrane not sharply delimited. Male with style extending posteriorly well beyond apex of connective, with a lobe near midlength (as in *A. albofasciata* (Walker), fig. 185*e*); connective U-shaped; paraphyses with stalk much longer than rami which are curved, strongly divergent, each tapering and acute at apex; aedeagus triangular in lateral view with its posterior margin regularly convex. Female abdominal sternum VII well produced, lateral margins slightly tapered, posterior margin with a very slight convexity on each side of a very slight median concavity.

Color of crown and pronotum black, with transverse arc on crown and a transverse band on pronotum at its midlength, attaining lateral margins; forewing chocolate brown with three pale yellow spots in basal half of each wing, one in base of clavus, one beyond its midlength, and the third in corium, and with two transverse pale yellow bands in apical half of wing, one extending from base of outer anteapical cell slightly obliquely to claval suture near its

apex, and the second extending from near costal margin across apices of anteapical cells to outer margin of inner apical cell; face, pleura, venter, and legs amber with upper portion of face darker.

Holotype male and one female, Tijuco Preto, Espírito Santo, Brazil, December 1936 (A. Maller); one female, Passa Quatro, Minas Gerais, Brazil, December, 1921 (A. Maller) (AMNH). One male and three females, Espírito Santo, Brazil, from Fruhstorfer collection (HNHM). One female, Espírito Santo, Brazil (ZIL). One male, Rio de Janeiro, Minas Gerais border, Brazil (F. Wiengreen); one male, Espírito Santo, Brazil; and one female, Espírito Santo, Brazil from Fruhstorfer collection (ZIMH). One male and two females, Espírito Santo, Brazil, from Fruhstorfer collection; one male, border between Rio de Janeiro and Minas Gerais, Brazil; and one male, Espírito Santo, Brazil (MMB). One female, Caraça, Minas Gerais, Brazil, February 1, 1885 (E. Gounelle); and one female, "Matusinhos", Minas Gerais, Brazil, April 3, 1885 (E. Gounelle) (MHNP). One male and two females, Espírito Santo, Brazil (USNM).

The chocolate brown color of the forewing, the slightly more robust form, and the long stalked male paraphyses will separate *A. incredibilis*, n. sp., readily from other species in the genus. As pointed out above, this species has been commonly misdetermined as *A. elegantissima* (Blanchard). It is more closely related to *A. albofasciata* (Walker) than to any other species in the genus.

Amblyscartidia pardaliota, NEW SPECIES

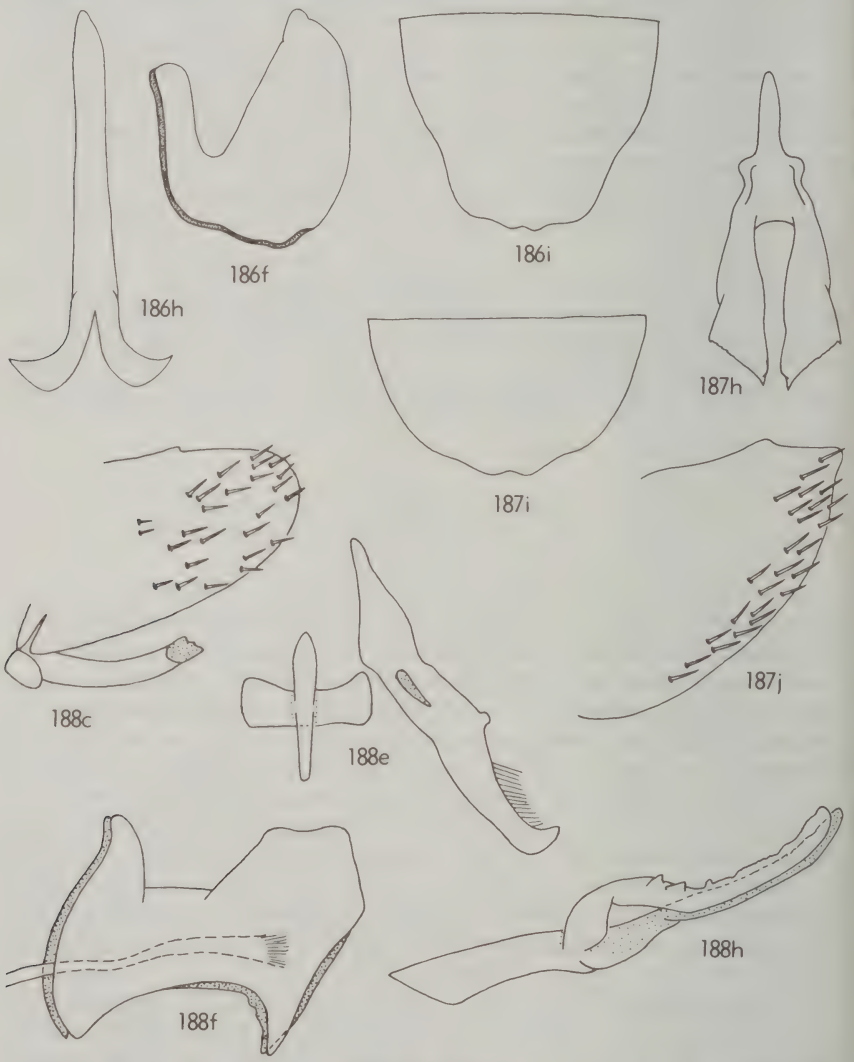
FIGURE 189, PAGE 233

Length of male 9.3-9.4 mm, of female 9.6-9.9 mm. Head with median length of crown approximately one-half interocular width, and approximately three-tenths transocular width; clypeus with muscle impressions usually not very distinct; clypellus in profile continuing contour of face. Pronotum with width greater than transocular width of head, lateral margins convergent anteriorly; dorsopleural carinae incomplete, posterior margin convex; forewing with membrane distinct, including all of inner apical cell and of remaining apical cells except their bases. Male with style extending posteriorly as far as apex of connective, with a lobe near apex; connective Y-shaped; paraphyses with stalk very short, rami widely separated at their bases and much longer than stalk, each with an erose margin near apex; aedeagus with apical margin bilobate, the gonoduct located in the ventral lobe. Female abdominal sternum VII with a broad median lobe which is shallowly concavely emarginate medially.

Ground color of crown, pronotum, scutellum and forewing red, the arcuate yellow band of crown broadened between ocelli, with round yellow spots as follows: one on each side of pronotum extending laterally over lateral margin; one in basal half and one in apical half of clavus; and three in corium of each forewing, the spots located opposite midclavus, at anterior portion of apical half of wing and touching costal margin, and touching claval suture at apex of latter; with a short transverse yellow band from costal margin across bases of

apical cells to outer margin of inner apical cell; membrane fumose; face, venter, and legs red except a large median clypeal yellow spot, some black at base of clypeus and at apex of clypellus, propleura yellow and continuous with the lateral pronotal spot on each side.

Holotype male, Botucatu, São Paulo, Brazil, October 17, 1970 (Max Menezes) (USNM). One female, Espírito Santo, Brazil, from Fruhstorfer



FIGURES 186-188.—186, *Amblyscartidia incredibilis,* n. sp. (*f, h,* from specimen from São Paulo, Brazil; *i* from Minas Gerais, Brazil). 187, *A. feminae,* n. sp. (*h* from holotype; remainder from topotypic specimen). 188, *A. luteolinea* (Taschenberg), lectotype (plate damaged in *c; h* from lateral view).

collection (ZIMH). One male, near Passa Quatro, banks of "Rio las Piedras", Minas Gerais, Brazil, 1000 m., 1903 (E. R. Wagner); one male, São Paulo, Brazil, 1898 (Noualhier) (MHNP). One male and one female, Espírito Santo, Brazil (HNHM).

Amblyscartidia pardaliota, n. sp., is similar to *A. albofasciata* (Walker), but differs in that the stalk of the paraphyses is shorter and the rami are more widely separated at their bases, the apex of the aedeagus is concave in lateral view, and in the red ground color.

Amblyscartidia dariona, NEW SPECIES

FIGURE 190

Length of male 9.1-9.6 mm, of female 8.8-9.6 mm. Head with median length of crown varying from slightly less than six-tenths to six-tenths interocular width and from slightly less than one-third to slightly less than four-tenths transocular width; clypellus in profile continuing contour of clypeus. Pronotum with width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete or not, posterior margin convex or concave; forewing with membrane distinct and as in *A. pardaliota*, n. sp., or not distinctly delimited. Male with style extending posteriorly as far as apex of connective, with a lobe near midlength of shank, apex concavely truncate; paraphyses as in *pardaliota* except not erose apically, apex abruptly curved and without a small triangular prominence before tip; aedeagus with apical margin more deeply concave than in *pardaliota*, dorsal lobe with rasp-like processes near apex in some specimens, gonoduct located in ventral lobe.

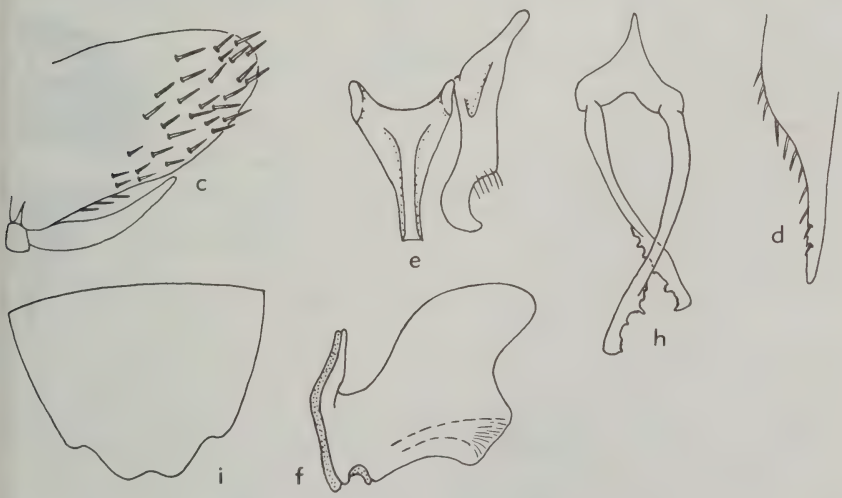
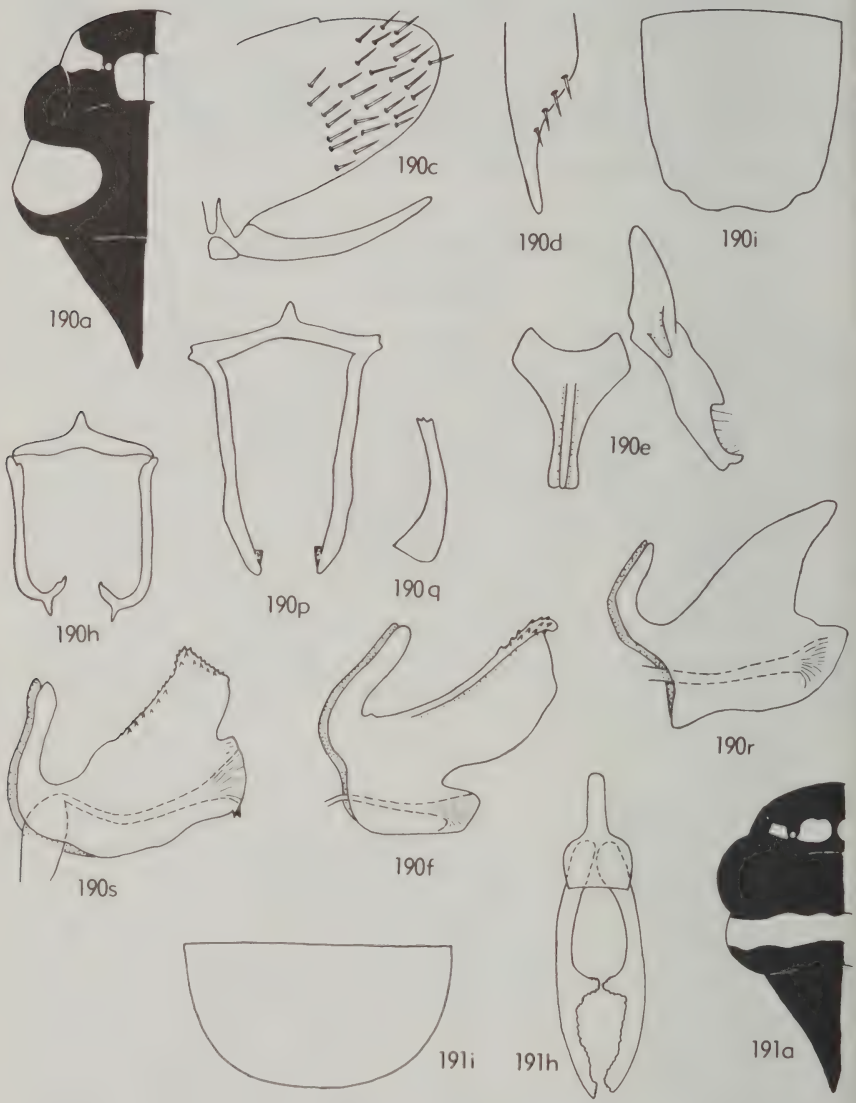


FIGURE 189.—*Amblyscartidia pardaliota*, n. sp. (*i* from specimen from Espírito Santo, Brazil; remainder from holotype; *h* from dorsal view).



FIGURES 190, 191.—190, *Amblyscartidia dariona*, n. sp. (*a*, *s*, from specimens from Rio de Janeiro, Brazil; *c-f*, *h*, from holotype; *i* from D. F., Brazil; remainder from Ubatuba, São Paulo, Brazil; *h* from dorsal view): *p*, Paraphyses from dorsal view; *q*, apex of paraphysis from lateral view; *r*, *s*, aedeagus from lateral view. 191, *A. juliacoides*, n. sp. (from specimens from Santa Catharina, Brazil).

Female abdominal sternum VII as in *pardaliota* but with median lobe broader and with median apical concavity less distinct.

Ground color of crown, pronotum, scutellum, and forewing black, with yellow or red spots arranged as in *pardaliota*; face black except an oval median yellow or red spot on clypeus and dull yellow area on each side of lateral clypeal sutures; proepisternum black or brown, proepimeron red or yellow (continuous with lateral spot of pronotum), remainder of thoracic pleura and venter black, legs and abdominal venter orange, female with apex of sternum VII black.

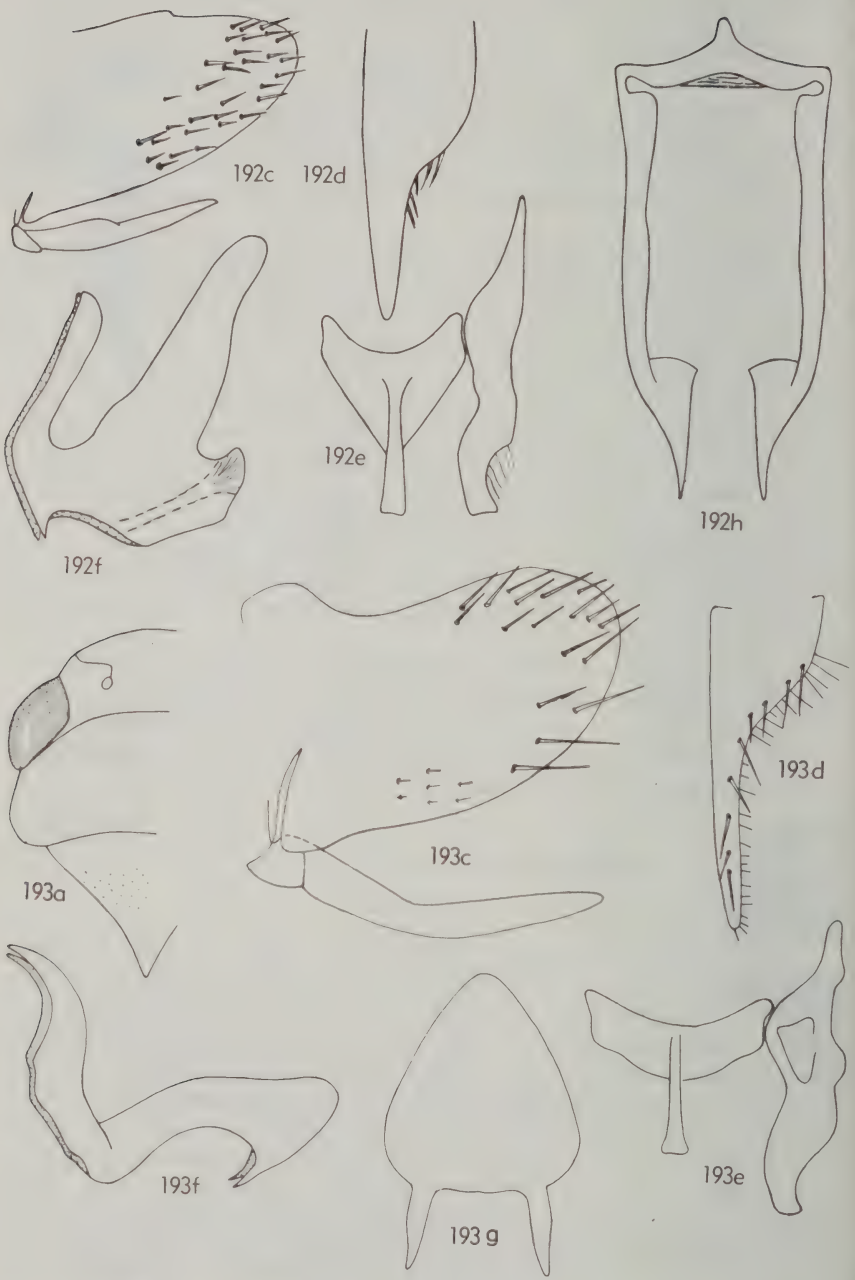
Holotype male and four females, Rio de Janeiro, Brazil, October, from C. F. Baker collection (USNM). One female, same data as preceeding, and one female, Rio de Janeiro, Brazil, August 16, 1898 (HNHM). One male, Brazil (MMB). One female, Rio de Janeiro, July 24, 1923 (G. L. R. Hancock), on palm tree (BM). One male, Ilha Grande, Brazil, October 7, 1893 (ZIMH). One male and one female, Rio de Janeiro, Brazil (CM). Three males, Ubatuba, São Paulo, Brazil, August 24, 1965; one female, "H. Florestal", April 12, 1932 (H. Simoes); one female, Florestal da Macao, Guanabara, Brazil, December 29, 1959 (Werner e Alvarenga) (OSU). One male, Rio de Janeiro, Brazil, August 10, 1946 (Wygodzinsky); one male, Nova Teutonia, Brazil, February 8, 1937 (F. Plaumann); one male, "Corcovalho", Rio de Janeiro, Brazil, October 31, 1942 [collector's name illegible] (Naturhistorisches Museum, Basel). One female, Rio de Janeiro, Brazil, 1911 (A.M.C.) (AMNH).

A. dariona, n. sp., resembles *A. pardaliota* and *A. duodecimpunctata* (Germar) in appearance, but the spots are on a black background instead of a red one as in *pardaliota*. The spots are larger than in *duodecimpunctata*. The male genitalia of *dariona* are like the last in that the styles are truncate apically, but the dorsal lobe of the aedeagus is broader and shorter.

Amblyscartidia amissa, NEW SPECIES

FIGURE 193

Length of male 6.7-7.1 mm, of female 6.7 mm. Head with median length of crown from slightly more than four-tenths to slightly less than one-half interocular width and from one-fourth to slightly less than three-tenths transocular width, ocelli located behind a line between anterior eye angles and slightly closer to median line of crown than to adjacent anterior eye angle, crown with a slight transverse concavity before ocelli; clypeus with muscle impressions not distinct, clypellus with lower portion more nearly horizontal than profile of remainder of face. Pronotum with width approximately equal to transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae incomplete, posterior margin concave, disk without sculpturing; forewing with membrane not sharply delimited, base of fourth apical cell aligned with base of third. Male with style extending posteriorly beyond apex of connective, with lateral lobe near midlength; connective Y-shaped; paraphyses with stalk broad, rami very short and acute; aedeagus in lateral view with shaft slightly decurved in apical half, less broadened apically than



FIGURES 192, 193.—192, *Amblyscartidia duodecimpunctata* (Germar). 193, *A. amissa*, n. sp., holotype (*h* from dorsal view).

in most other species of genus, and with a pair of short acute apicoventral processes. Female abdominal sternum VII moderately produced, posterior margin bluntly tapered, with a slight median convexity; ovipositor with second valvulae acute apically, ventral margins rectilinear; pygofer with macrosetae in a narrow group parallel to apical and apicoventral margin.

Male with crown, pronotum, and forewings brown, scutellum tan, crown with a yellow spot above antennal ledge touching ocellus on each side and a transverse oval yellow spot on each side of pronotal disk, forewing with an elongate spot bordering claval suture in its basal half and two small spots on corium opposite apical one-third of claval suture, ivory tinged with blue; face with disk of clypeus and clypellus brown, median area of clypeus in some specimens (holotype) yellow, remainder of face dull yellow except dark borders of genae beneath eyes; thoracic pleura dull yellow, in some specimens with dark markings; legs brown. Female with crown yellow, unmarked, concolorous with scutellum, pronotal spots less distinct, confluent medially in one specimen; forewings paler brown than in male and with pale spots less contrasting, otherwise as in male.

Holotype male, "Rio Vitaco", Venezuela?; one male "Hohenau", Venezuela?; two males and two females, "Alto de las Cruces" Venezuela? (two of these labeled also "W. Cordillera") (MMB).

A. amissa, n. sp., differs from other species of *Amblyscartidia* in its smaller size, in the presence of apicoventral processes on the aedeagus, and in the form of the paraphyses of the male. The second valvulae of the ovipositor are more acute apically than in *A. albofasciata* (Walker) (fig. 185*m*) and the ventral margins are rectilinear instead of convex.

Amblyscartidia juliacoides, NEW SPECIES

FIGURE 191, PAGE 234

Length of male 8.0 mm, of female 8.0-8.3 mm. Head with median length of crown slightly less than one-half interocular width and approximately three-tenths transocular width; clypeus with muscle impressions not very distinct; clypellus in profile continuing profile of face. Pronotum with width less than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, posterior margin convex or concave; forewing with membrane not sharply delimited. Male genitalia with style extending approximately as far posteriorly as apex of connective, with a lobe near midlength; connective Y-shaped; paraphyses with stalk much shorter than rami which are approximate at their bases, bear a median lobe near their midlength and each with the inner margin erose from the base of the lobe to the apex of the ramus; aedeagus as in *A. albofasciata* (Walker). Female abdominal sternum VII weakly produced, with posterior margin varying from regularly convex (fig. 191*i*) to transverse and with a weak posterolateral lobe on each side.

Ground color of crown, pronotum, and scutellum black, pale markings sordid yellow to ivory often with a bluish tinge, transverse pale arc of crown interrupted at transition of antennal ledge to face, pronotum with pale transverse band attaining lateral margins; forewing with a diagonal pale line in

basal two-thirds of clavus, the line often with a lobe on or near its inner margin near base and often interrupted behind this lobe, outer margin of brachial cell broadly pale through most of its length except near base and with a short transverse pale spot beyond its apex; with an elongate pale band extending from wing base to base of outer anteapical cell and containing vein R, with an arcuate pale transverse band across bases of apical cells to outer margin of inner apical cell; face black except a median longitudinal pale line on clypeus at its base, pale lora and portion of genae adjacent to clypeus, pleura black except pale proepimeron, legs and abdominal venter castaneous.

Holotype male, two females, and one specimen without abdomen, "Corupa", Santa Catharina (Hansa Humboldt), Brazil, March 1948 (A. Maller), and two females, same data except dates, September, 1945 and November, 1945 (AMNH). Three males Hansa, Brazil, 1937 (ZIL). One male, Santa Catharina, Brazil (RMS). One male and one female, "San Leopoldo", Brasilia, Brazil; and two females, Therezopolis, Santa Catharina, Brazil (MMB).

A. juliacoides, n. sp., is close to *A. albofasciata* (Walker) in the structure of the male genitalia. It differs from all other species in the genus in the linear pale markings of the forewings.

Amblyscartidia feminae, NEW SPECIES

FIGURE 187, PAGE 232

Length of male 8.5-8.7 mm, of female 9.6-10.0 mm. Head with median length of crown varying from slightly more than one-half to slightly more than six-tenths transocular width and from three-tenths to slightly less than four-tenths transocular width; clypeus with muscle impressions distinct; clypellus in profile continuing contour of clypeus. Pronotum and forewing an in *A. incredibilis*, n. sp. Male with style extending as far posteriorly as apex of connective, form of style and connective as in *A. albofasciata* (Walker); paraphyses with stalk much shorter than rami which are shorter and broader than in *albofasciata* and obliquely truncate apically; aedeagus as in *albofasciata*. Female abdominal sternum VII weakly produced, posterior margin broadly convex with a very weak median concavity.

Color of crown, pronotum, and forewings as in *incredibilis*; face with middle of clypeus and clypellus black, with a median yellow band on clypeus, remainder of face amber except a small black area on each gena beneath eye; proepimeron, and in some specimens proepisternum also, concolorous with pronotal band which continues without interruption onto proepimeron, remainder of pleura, venter, and legs amber.

Holotype and one additional male and three females, Entre Rios, Rio de Janeiro, Brazil, September, from C. F. Baker collection (USNM).

A. feminae, n. sp., is close to *A. incredibilis*, which it resembles externally except for the abdominal sternum VII of the female. The paraphyses of the male differ from *incredibilis* in having a shorter stalk and in the broader rami that are truncate apically.

31. PARATUBANA, NEW GENUS

FIGURES 194-198

Type-species: *Tettigonia vittifacies* Signoret.

Length 7.5-10.7 mm.

Head not produced, median length of crown varying from four-tenths to slightly more than six-tenths interocular width and from one-fourth to slightly more than one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each slightly closer to median line than to adjacent anterior eye angle, crown with a shallow transverse concavity across ocelli; without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus convex or slightly flattened medially, muscle impressions distinct or not, transclypeal suture obsolete medially, clypellus with profile continuing contour of clypeus.

Thorax with pronotal width equal to or less than transocular width of head, lateral margins parallel or convergent anteriorly, dorsopleural carinae usually incomplete, posterior margin weakly concave, disk without sculpturing, scutellum not striate behind transverse sulcus. Forewing with membrane sharply delimited, varying interspecifically in extent, otherwise as in *Amblyscartidia*, new genus. Hindleg as in *Amblyscartidia*.

Male genitalia: Male pygofer weakly to moderately produced, posterior margin convex or angulate, surface with numerous macrosetae on posterior half; plates triangular, not extending as far posteriorly as pygofer apex; style extending posteriorly to a varying degree in relation to apex of connective,

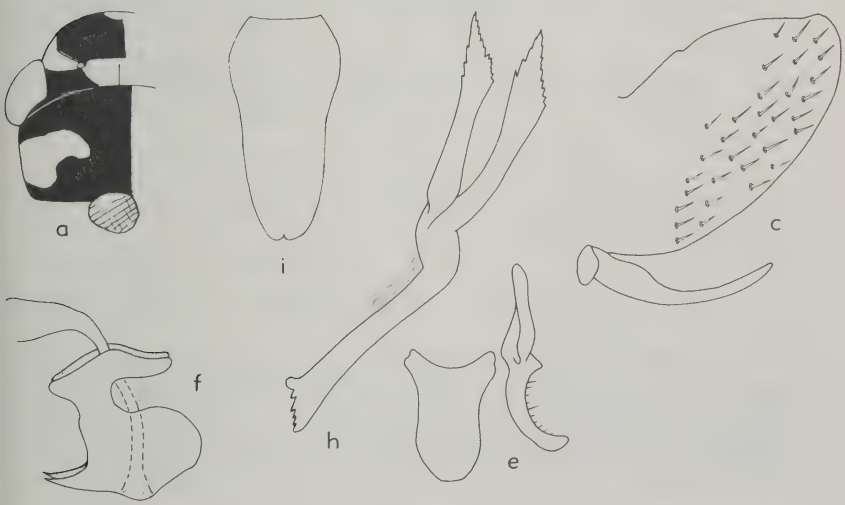


FIGURE 194.—*Paratubana westwoodi* (Signoret) (*a, i,* from specimen from Brazil; remainder from Minas Gerais, Brazil; *h* from lateral view).

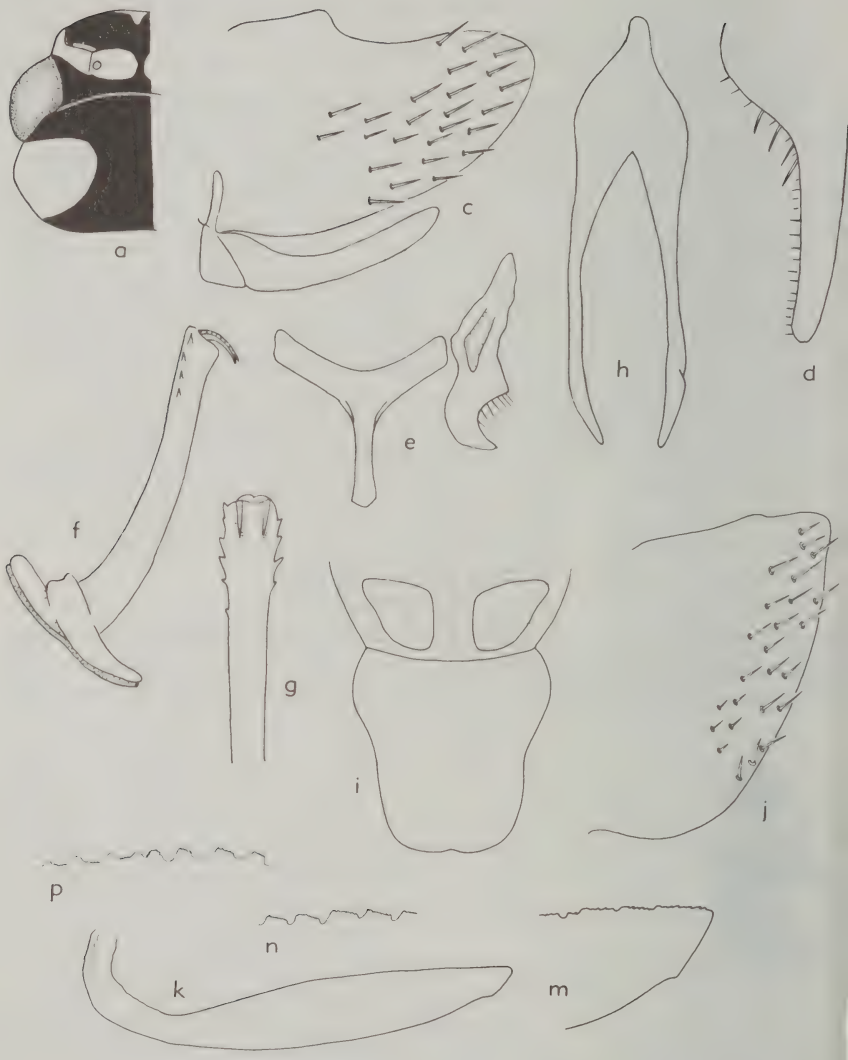


FIGURE 195.—*Paratubana vittifacies* (Signoret) (*a, c-h,* from specimen from São Paulo, Brazil; remainder from "Guaituba," São Paulo, Brazil; only apical part of shaft shown in *g; h* from caudoventral view; *i* showing membrane of genital chamber with sclerites, attached to sternum VII): *p,* Teeth at base of second valvulae.

with a lobe near midlength; connective variable; paraphyses present, symmetrical, stalked or not; aedeagus usually with apical processes (exception: *P. vittifacies* (Signoret)) and with lobate or acute anteapical processes.

Female abdominal sternum VII slender and well produced, truncate and occasionally slightly emarginate medially at apex. Second valvula of ovipositor of *vittifacies* (fig. 195*m*) much as in *Amblyscartidia*, except that the dorsal margin is more convex, and the widest primary teeth are near valvular apex. Pygofer not strongly produced, with a number of macrosetae on posterior half.

Species of *Paratubana* are blunt-headed with paired pale pronotal spots and with a median clypeal pale spot that is bordered with black. Specimens have been seen only from southeastern Brazil and northern Argentina. The species are very similar in appearance to species of *Amblyscartidia* but the males usually do not have the dorsal aedeagal modifications of the shaft found in *Amblyscartidia* and the females have a more slender, more strongly produced abdominal sternum VII than in the latter genus.

Of a series of specimens of *P. luteomaculata* (Signoret) determined by Melichar in MHNP, only two appear to be accurately determined. The present interpretation is based on the male of this pair. I have studied the lectotype (fig. 198) of *Tettigonia nigrocincta* (Signoret).

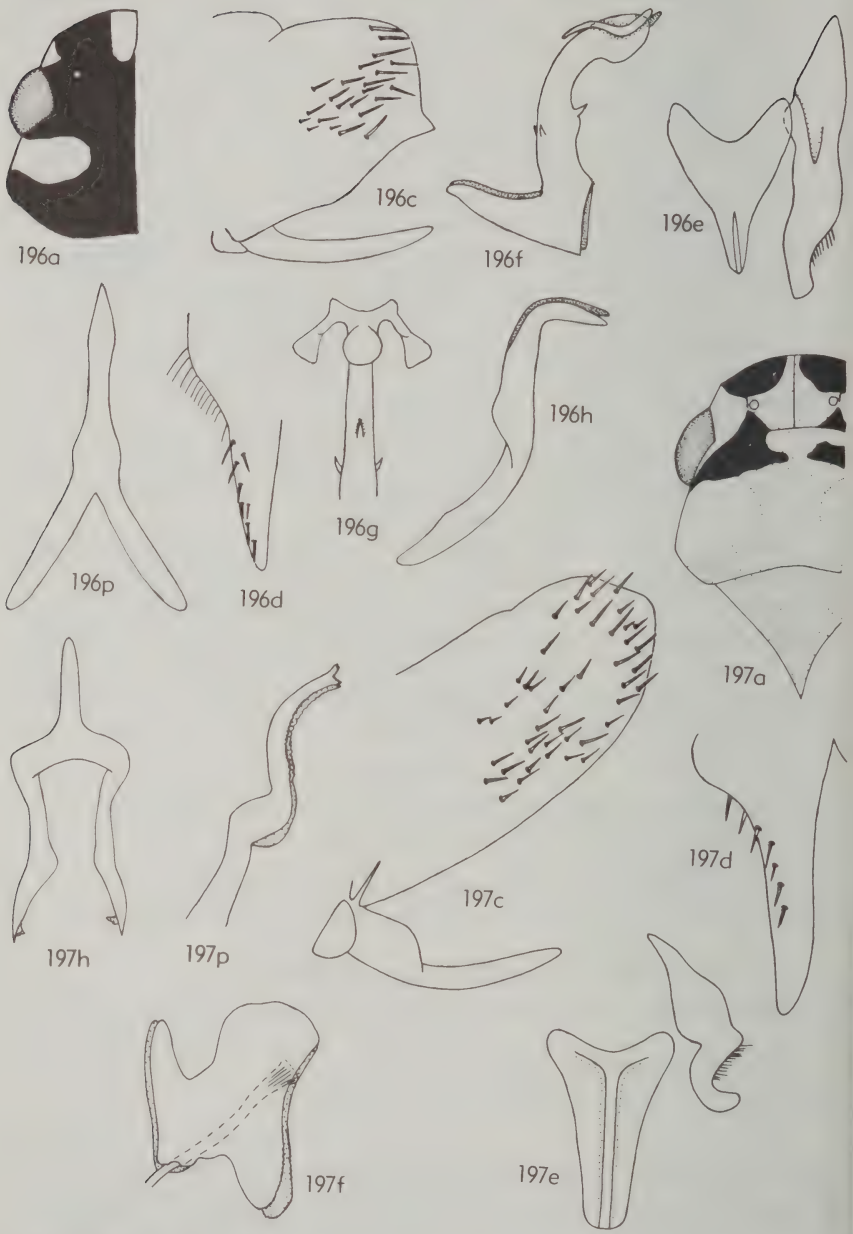
I have seen no specimen eligible for the lectotype of *Tettigonia vittifacies* (Signoret). The specimen(s) should be in Berlin. The present interpretation of this species is the same as specimens determined by Melichar in MHNP. *Tettigonia westwoodi* Signoret is represented in the Signoret collection in NMV by two females, one of which was damaged by mould, the other (fig. 194 in the present work) of which has broken wing apices. A specimen in MHNP, probably seen by Signoret, has no abdomen.

SPECIES OF *PARATUBANA*

luteomaculata (Signoret), 1853b:350 (*Tettigonia*). SE. Brazil. New combination.
nigrocincta (Signoret), 1855d:774 (*Tettigonia*). SE. Brazil. New combination.
vitiliginis, n. sp. Argentina.
vittifacies (Signoret), 1855d:774 (*Tettigonia*). SE. Brazil. New combination.
westwoodi (Signoret), 1853b:364 (*Tettigonia*). SE. Brazil. New combination.

KEY TO SPECIES OF *PARATUBANA*

1. Forewings with a diagonal white stripe in clavus and a parallel one in corium ..... *westwoodi* (Signoret) (fig. 194)
   Forewings without pale stripes 2
2. Pronotal pale spots attaining humeral margin ..... *vittifacies* (Signoret) (fig. 195)
   Pronotal spots not attaining humeral margin (fig. 196*a*, 197*a*) 3
3. Pygofer very short, with a posteroventral angle; paraphyses long-stalked ..... *vitiliginis*, n. sp., page 243
   Pygofer longer (figs. 197*c*, 198*c*), without a posteroventral angle; paraphyses short-stalked 4



FIGURES 196, 197.—196, *Paratubana vitiliginis*, n. sp., holotype (only aedeagal shaft shown in *g*; *h* from lateral view): *p*, Paraphyses from caudoventral view. 197, *P. luteomaculata* (Signoret) (from specimens from Rio de Janeiro, Brazil; *h* from dorsal view): *p*, Paraphyses from lateral view.

4. Length 10 mm or more; aedeagus with paired lobate shaft processes and without apical processes ..... *luteomaculata* (Signoret) (fig. 197)
Length less than 8.5 mm; aedeagus with acute shaft processes and conspicuous acute apical processes ..... *nigrocincta* (Signoret) (fig. 198)

Paratubana vitiliginis, NEW SPECIES

FIGURE 196

Length 10.3 mm.

Head with median length of crown one-half interocular width in male, approximately four-tenths interocular width in female; median coronal length approximately one-third transocular width in male, slightly more than one-fourth transocular width in female; clypeus convex, muscle impressions distinct. Thorax with pronotal width equal to transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete.

Male pygofer weakly produced, posterior margin angulate; style extending posteriorly slightly farther than apex of connective, subtruncate at apex; connective Y-shaped with arms longer than stem; paraphyses with rami shorter than base, strongly diverging; aedeagus with apical processes expanded apically and truncate, shaft with a pair of dorsolateral processes and an unpaired median ventral process, all short and acute.

Female abdominal sternum VII with posterolateral margins oblique and convex to truncate apical margin. Second valvula of ovipositor with ventral margin almost rectilinear and with apex more broadly rounded than in *P. vittifacies* (Signoret) (fig. 195*m*) and with broader teeth near base of toothed portion; pygofer as in *vittifacies*.

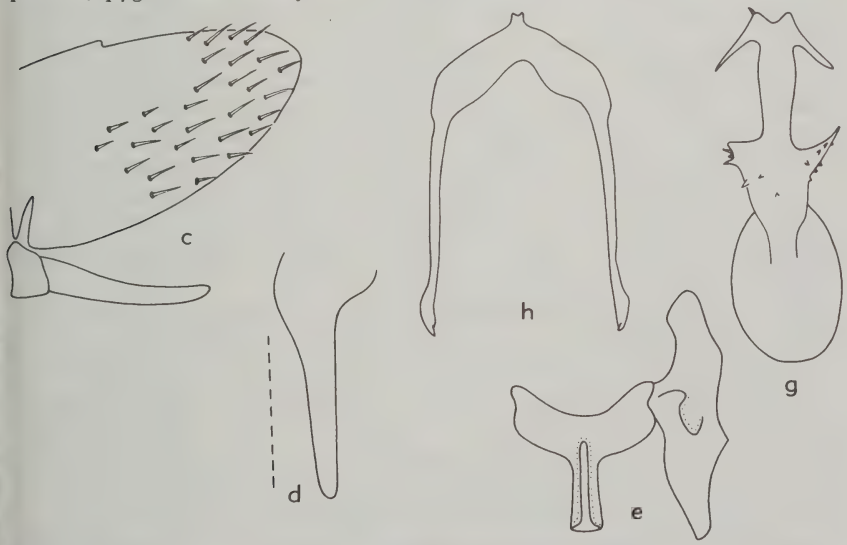


FIGURE 198.—*Paratubana nigrocincta* (Signoret), lectotype (setae rubbed off in *d*).

Ground color of crown, pronotum, and forewings dark brown to black; scutellum paler brown; crown with a median stripe in apical half extending over apex, and narrow apical portions of antennal ledges, yellow; pronotum with a pair of oval transverse yellow spots at midlength; scutellum unmarked; forewing with following yellow markings: a large round spot in basal half of clavus and a smaller spot beyond its midlength, three spots in corium opposite clavus, and a transverse spot across bases of outer three apical cells; face with median coronal yellow stripe extending over middle of clypeus almost to transclypeal suture, broadly bordered with black on each side over muscle impressions, antennal ledges yellow, clypellus black medially; remainder of face tan; proepimeron yellow; remainder of pleura and legs except dark tarsal apices, brown.

Holotype male, Loreto, Misiones, Argentina, December 8, 1931 (A. A. Ogloblin); two females, Misiones, Argentina, November 9, 1941 (Daguerre) (USNM).

Paratubana vitiliginis, n. sp., can be separated from other species of the genus by the characters used in the key.

32. CARAGONALIA, NEW GENUS

FIGURES 199-201

Type-species: *Tettigonia carminata* Signoret.

Length 8.0-10.7 mm.

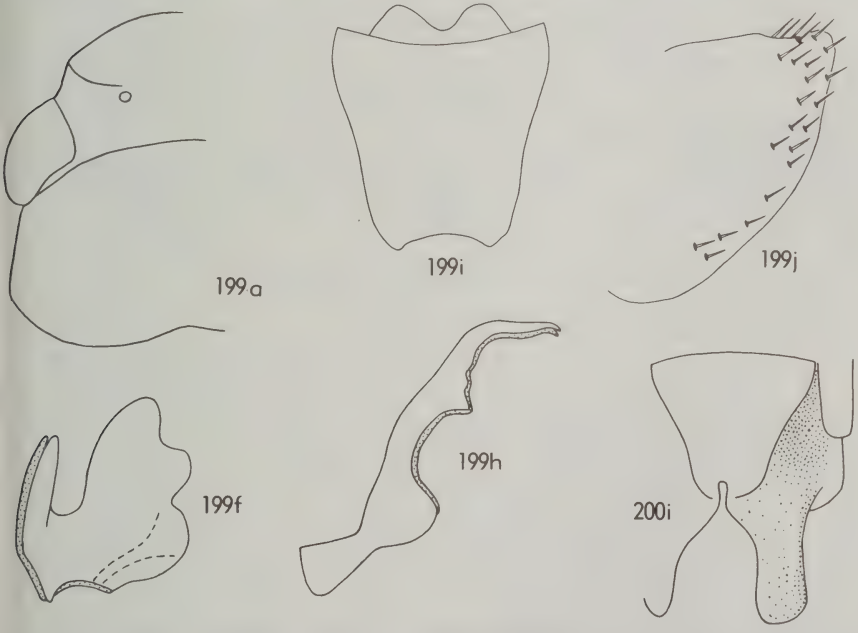
Head slightly produced, median length of crown from slightly more than four-tenths to slightly more than one-half interocular width and from slightly more than one-fourth to one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant from median line and adjacent anterior eye angle, crown with a slight transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus convex, or slightly flattened, muscle impressions distinct, clypellus with fine short sparse pubescence, transclypeal suture obsolete, clypellus not strongly produced but in profile with its lower portion curved more posteriorly than remainder of contour of face.

Thorax with pronotal width greater (*C. carminata* (Signoret)), or equal to or less (*C. tarsalis* (Signoret)) than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae incomplete, posterior margin concave, disk without sculpturing or pubescence; scutellum with weak sculpturing on its posterior half. Forewing with membrane smoky, variable in extent intraspecifically, including at least apical cells and in some specimens a portion of anteapical cells, veins not very distinct, not elevated, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with

femoral setal formula 2:1:1; length of first tarsomere equal to or greater than combined length of two more distal tarsomeres (variable interspecifically) and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced; posterior margin convex, posteroventral margin slightly concave, with a number of macrosetae arising parallel to posterior and posteroventral margins. Plates elongate, slender, triangular, extending as far posteriorly as pygofer apex, each with a few uniseriate macrosetae in basal half. Style extending posteriorly as far as or slightly farther than apex of connective, truncate apically, with preapical lobe. Connective Y-shaped. Aedeagus symmetrical, with a broad dorosapical lobe. Paraphyses paired, symmetrical, short-stalked.

Female abdominal sternum VII with posterior margin shallowly concave. Membrane of genital chamber with two bilobed sclerites. Ovipositor with second valvula broadened and bearing teeth in most of its length beyond basal curvature, broadest before midlength, teeth near base irregular and without secondaries, with very broad primaries in remainder of length almost to apex, each of the primaries bearing a number of secondary denticles, with a number of very small denticles anteapically on posterodorsal and posteroventral margins. Pygofer with a few anteapical macrosetae, or a larger number of macrosetae parallel to posteroventral margin and continuing dorsally to dorsal margin.



FIGURES 199, 200.—199, *Caragonalia tarsalis* (Signoret) (*a, f, h,* from lectotype; remainder from specimen from Minas Gerais, Brazil; *h* from lateral view). 200, *C. monstruosa* (Signoret) (from specimen from Brazil, left side of female abdominal sternum VII from ventral view).

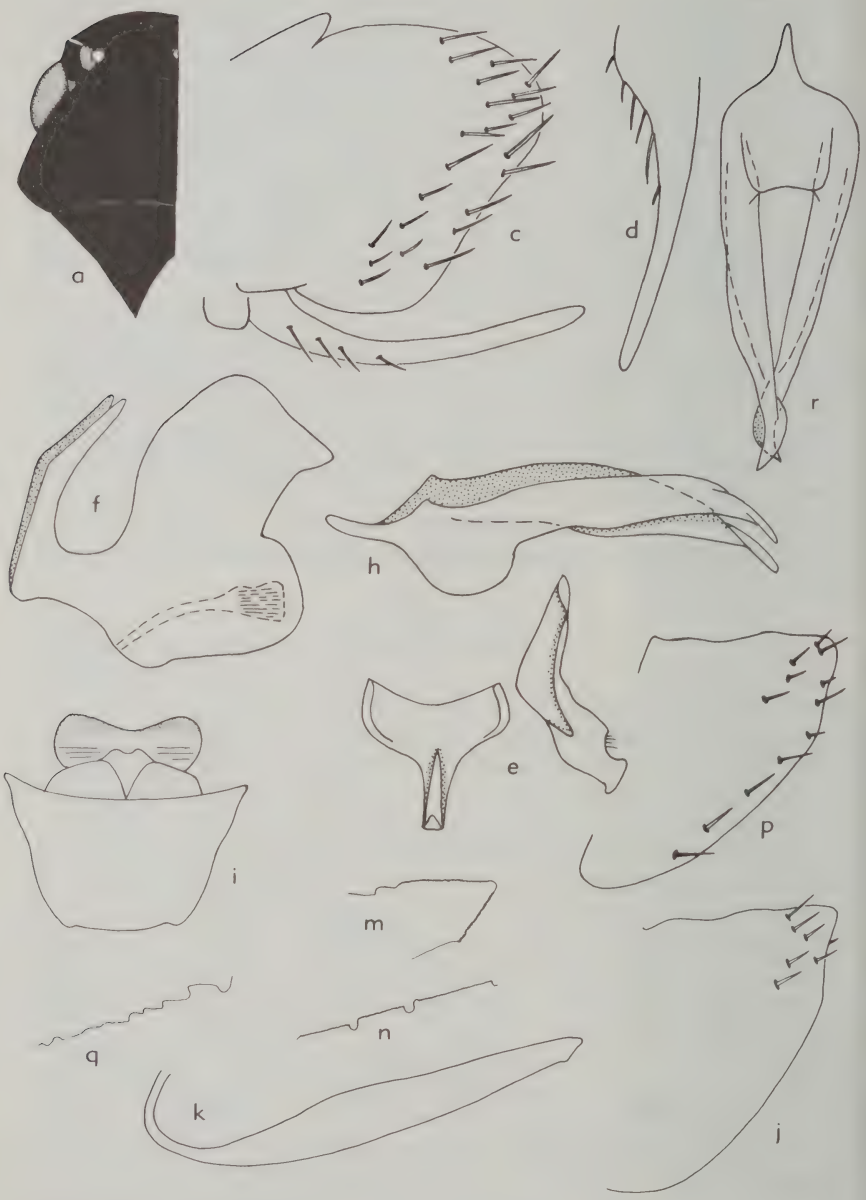


FIGURE 201.—*Caragonalia carminata* (Signoret) (*a* from specimen from Brazil; *i-k, m, n, p, q,* from Corupa, Sta. Catharina, Brazil; remainder from Rio Grande do Sul, Brazil; *h* from lateral view; *i* showing sclerites in membrane of genital chamber): *p,* Female pygofer from lateral view; *q,* teeth at base of second valvula; *r,* paraphyses from ventral view.

Species of *Caragonalia* occur only in southeastern Brazil. *Caragonalia* is similar to *Chichahua*, new genus, in the description of which distinguishing characters are treated. In color, *C. carminata* is similar to *Pawiloma ancora*, n. sp.

My interpretation of *C. carminata* (Signoret) is based on an examination of a female in NMV determined by Signoret. There were no additional specimens from the type-series. A male in a series of specimens in MHNP agreed with the illustrations here. Specimens in the BM determined as *rutilans* Walker were conspecific.

I have examined the female lectotype of *Tettigonia monstruosa* Signoret (fig. 200) and the male lectotype (fig. 199) of *T. tarsalis* Signoret, both in NMV. I have not seen a male of *monstruosa*, but females of *tarsalis* (fig. 199*i*) differ from the lectotype of *monstruosa*. Signoret, in the original description of *tarsalis*, discussed the similarity to *monstruosa*, and I cannot separate the species other than by the female structures illustrated here.

SPECIES OF *CARAGONALIA*

carminata (Signoret), 1855d:834 (*Tettigonia*) (new name). SE. Brazil. New combination.
rutilans (Walker), 1851b:752 (*Tettigonia*) (preoccupied).
monstruosa (Signoret), 1853b:335 (*Tettigonia*). New combination.
tarsalis (Signoret), 1855d:769 (*Tettigonia*). SE. Brazil. New combination.

KEY TO SPECIES OF *CARAGONALIA*

1. Forewings each with a pair of large black spots on red portion 2
   Forewings without black spots on red portion
   carminata (Signoret) (fig. 201)
2. Female abdominal sternum VII as in figure 199*i* ..... *tarsalis* (Signoret)
   Female abdominal sternum VII as in figure 200*i* ..... *monstruosa* (Signoret)

33. CHICHAHUA, NEW GENUS

FIGURES 202-204

Type-species: *Chichahua stygiana*, new species.

Length of male 8.9-10.4 mm, of female 9.2-9.5 mm.

Head not or only moderately produced, anterior margin broadly rounded, median length of crown from slightly more than one-half to almost three-fourths interocular width in male and from four-tenths to approximately one-half interocular width in female; median length from four-tenths to one-half transocular width in male and approximately one-third transocular width in female; with or without a carina at transition from crown to face (variable interspecifically), ocelli located on or before a line between anterior eye angles, closer to median line than to adjacent anterior eye angle in male, each equidistant from adjacent anterior eye angle and median line of crown in female; crown with a shallow median broad concavity and one on each side, the median one extending farther forward in the male, surface without pubescence; clypeus strongly concave medially and with muscle impressions

distinct or not, clypellus moderately to strongly convex in lateral view, contour of its lower portion more nearly horizontal than profile of clypeus, with a few setae near apex.

Pronotum with width variable interspecifically in relation to transocular width of head, lateral margins parallel or convergent anteriorly, dorsopleural carinae complete, posterior margin concave, surface with large impressions variable interspecifically in location, disk with or without transverse rugae, without pubescence; scutellum with posterior portion elevated and transversely rugose. Forewing with or without apical membrane, with or without an appendix, at least some of the veins conspicuously elevated, apical cells very short and variable, with at least an anteapical plexus of veins, texture coriaceous; wings of female (known only in *C. russeola*, n. sp.) exceeding apex of ovipositor. Hindleg at rest with knee not attaining posterior proepimeral margin (exception: *C. impressa*, n. sp.), femoral setal formula 2:0:0, first tarsomere with length variable in relation to combined length of two more distal tarsomeres and with setae of plantar surface irregular or in two parallel rows (varying interspecifically).

Male pygofer moderately produced with posterior margin broadly convex, setae variable in size, occurring on posterior two-thirds of disk, pygofer processes absent. Plates short, triangular, not extending posteriorly as far as pygofer apex, setae multiseriate, variable in size. Style varying interspecifically in length, apex hooked or broadly truncate. Connective short Y-shaped or platelike. Aedeagus curved posterodorsad, with a dorsoapical lobe and one or more ventral anteapical spinelike processes. Paraphyses present and almost symmetrical, or absent.

Female (based on *russeola*) abdominal sternum VII with posterior margin slightly convex, almost regular, but slightly biundulate medially. Ovipositor with second valvulae broadened and bearing dorsal teeth beyond basal curvature, the primaries very broad and bearing a number of secondary denticles, with a large number of very small denticles anteapically on posterodorsal and posteroventral margins. Pygofer with numerous small macrosetae in an interrupted submarginal group near posterodorsal and posteroventral margin.

Chichahua is known only from Colombia and Ecuador, and from a very small number of specimens. The female genitalia suggest a close relationship with *Caragonalia*, new genus. The concave clypeus, the plexus of veins in the forewing and the hind femoral setal formula of *Chichahua* will serve to separate the genera readily. *Chichahua* is also similar to *Orechona* Melichar in the treatment of which the relationship is discussed.

SPECIES OF *CHICHAHUA*

impressa, n. sp. Ecuador.
russeola, n. sp. Colombia, Ecuador.
stygiana, n. sp. Ecuador.

KEY TO SPECIES OF *CHICHAHUA*

1. Crown with a median Y-shaped elevation delimiting the broad shallow impressions ..... *impressa*, n. sp.
   Crown without such an elevation 2

2. Antennal ledges convex in anterolateral view; median coronal depression longer than the lateral ones ..... *stygiana*, n. sp.
Antennal ledges concave in anterolateral view; median coronal depression not longer than lateral ones ..... *russeola*, n. sp., page 251

Chichahua stygiana, NEW SPECIES

FIGURE 203

Length of male 10.1-10.4 mm. Head moderately produced, median length of crown slightly greater than one-half interocular width and approximately one-third transocular width, without a carina at transition from crown to face; crown with median concavity extending from near posterior margin of head almost to apex; clypeus with muscle impressions distinct, clypellus strongly convex in lateral view. Pronotum with width equal to transocular width of head, lateral margins convergent anteriorly, surface with deep impressions adjoining anterior margin behind each eye and lateral margin behind each eye, disk transversely rugose; forewing without a membrane, appendix present, all veins elevated and distinct, entire wing with a plexus of veins; hindleg with length of first tarsomere equal to combined length of two more distal tarsomeres, setae of plantar surface in more than two rows. Male pygofer and plates with microsetae only; style extending posteriorly much beyond apex of connective, apex slightly hooked; connective short Y-shaped; aedeagus with dorsoapical lobe not widely separated from shaft, anteapical processes short, spinelike, in an arcuate pattern; paraphyses short-stalked, the rami convergent apically, each with a short anteapical process. Female unknown.

Color of dorsum including forewings, black; face, all femora, tibiae, and tarsi, castaneous, bases of legs yellow.

Holotype and one additional male, Mt. Tungurahua, Ecuador, 2800 (holotype) and 2500 meters, April 6, 1939 (holotype) and June 15, 1937 (W. Clark-Macintyre) (NCS). Holotype on indefinite loan to USNM.

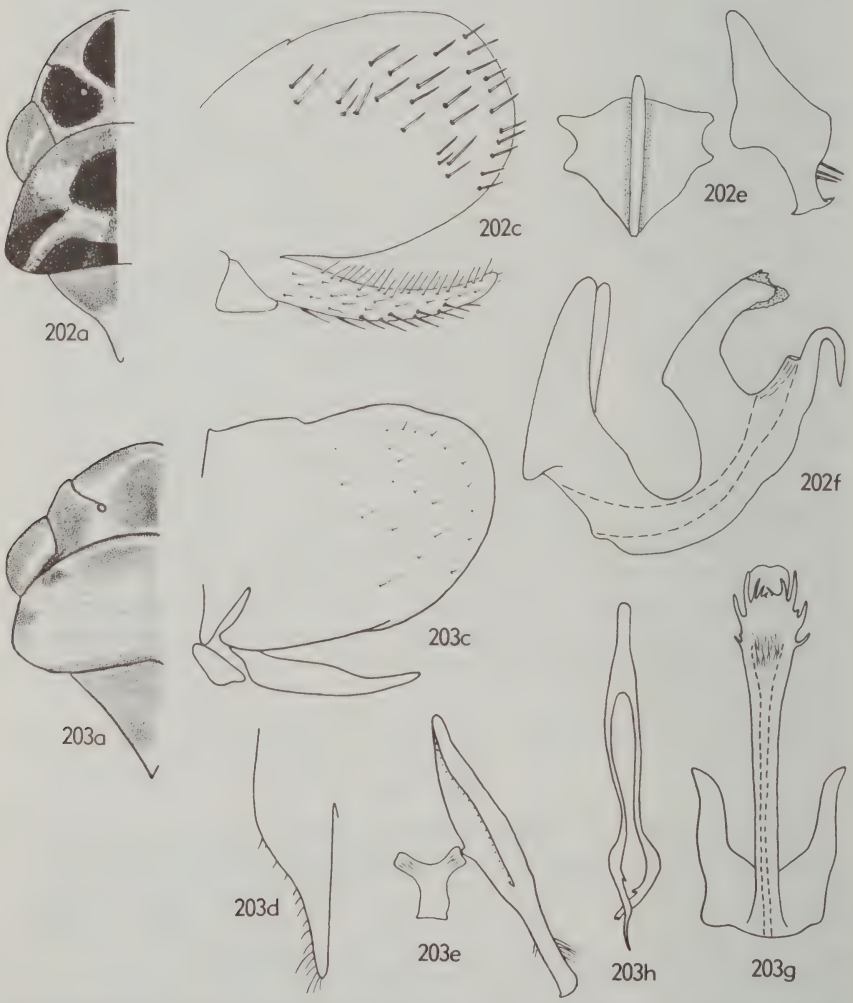
C. stygiana, n. sp., is closer to *C. impressa*, n. sp., than to *C. russeola*, n. sp., in external characters. It may be separated from both of the last by the nearly full-length median depression on the crown.

Chichahua impressa, NEW SPECIES

FIGURE 202

Length of male 8.8 mm. Head more strongly produced than in other species of the genus, median length of crown approximately seven-tenths interocular width and one-half transocular width, with a carina in median portion of transition from crown to face; crown with a Y-shaped median elevation separating the three concavities of which the median one extends over only slightly more than half length of crown; clypeus with muscle impressions distinct, clypellus weakly convex in lateral view. Pronotum with width greater than transocular width of head, lateral margins convergent anteriorly, surface

with a shallow median concavity before middle and two posterolateral concavities; forewing without membrane or appendix, only outer portion of corium with veins strongly elevated; clavus with plexus not very distinct and with supernumerary veins not as numerous as in corium; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres, setae of plantar surface in two parallel rows. Male pygofer and plates both bearing some macrosetae; style extending posteriorly as far as apex of connective, broadened and truncate apically; connective broad and platelike, narrower apically; aedeagus with dorsoapical lobe widely separated from



FIGURES 202, 203.—202, *Chichahua impressa,* n. sp., holotype. 203, *C. stygiana,* n. sp. (*a* from specimen from Baños, Ecuador; remainder from holotype).

shaft, anteapical ventral process median, single, recurved, acute; paraphyses absent. Female unknown.

Crown black except the three large depressions which are yellow and with a white pruinosity; pronotum castaneous with depressions as on crown; scutellum castaneous, its elevated posterior portion glabrous; forewings translucent except outer portion of corium and commissural margin which are fuscous; face, propleura, and legs brown, the last with all knees, and anterior tibiae, black.

Holotype male, Colombia, 1942 (L. Richter) on indefinite loan to USNM from NCS.

C. impressa, n. sp., is more similar to *C. stygiana*, n. sp., than to *C. russeola*, n. sp. Distinguishing characters are discussed under *stygiana*. In addition, the hind knees at rest extend forward well beyond the posterior proepimeral margins, a condition different from both of the other species.

Chichahua russeola, NEW SPECIES

FIGURE 204

Length of female 9.2-9.5 mm. Head not produced, its anterior margin slightly concave medially in dorsal view, median length of crown approximately one-half interocular width and approximately one-third transocular width, without a carina at transition from crown to face, crown with a transverse depression between ocelli delimited by an M-shaped elevation along basal margin, and a narrower lateral depression on each side, extending from upper margin of antennal ledge to basal margin of crown; clypeus with muscle impressions not very distinct; clypellus moderately convex in lateral view. Pronotum with width less than transocular width of crown, lateral margins parallel; pronotum with a transverse impression on each side behind eye, disk transversely rugose; forewing with apical portion membranous to a varying degree, appendix present, veins of corium elevated and distinct, with a plexus

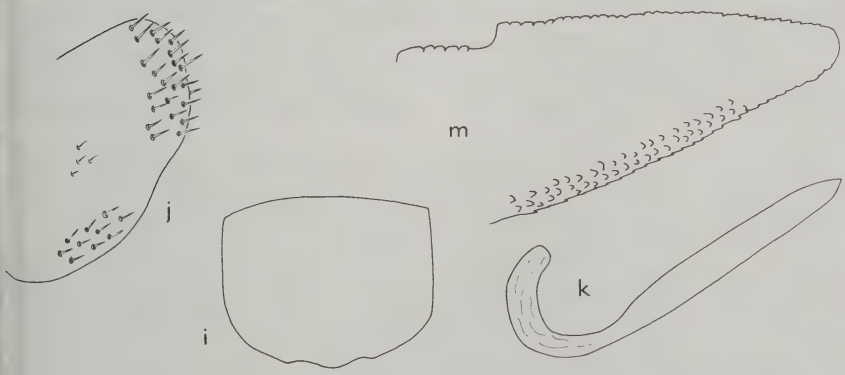


FIGURE 204.—*Chichahua russeola*, n. sp., holotype.

of veins at least in corium before apex; first hind tarsomere shorter than combined length of two more distal tarsomeres and with setae of plantar surface irregularly arranged. Male unknown. Female genitalia as in generic description.

Crown, pronotum, and scutellum black, crown with a quadrate pale mark at base bordering inner eye margin; forewing with inner portion of clavus pale, portion bordering claval suture and all of corium dark red except narrow costal black border and black apex; face black except narrow yellow line (interrupted in some specimens) on genae bordering lateral clypeal sutures; propleura and legs black.

Holotype female, Pasto, Nariño, Colombia, November 9, 1956 (M. Revelo), on potatoes (USNM). One female, Quito, Ecuador, December, 1951 (Nanndorf) (SSM). One female, Chillacocha, Ecuador (3900 m.), 1905 (P. Rivet) (MHNP). One female Ambato, Prov. Tungurahua, November, 1956 (NCS).

C. russeola, n. sp., differs from the other species in the genus in its shorter head, narrower pronotum with its parallel lateral margins, and the red markings of the wings.

34. Genus **ORECHONA** Melichar

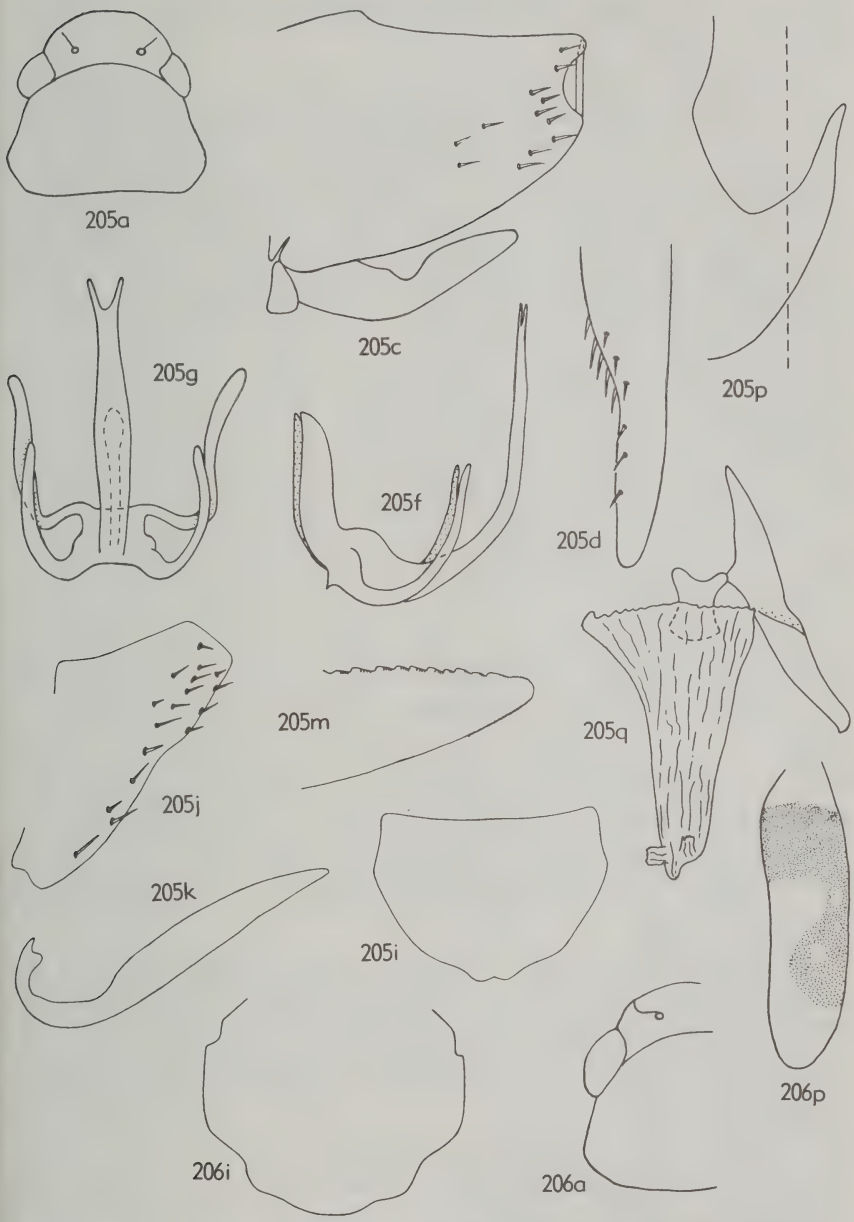
Figures 205, 206

Orechona Melichar, 1926a:345. Type-species: *O. trifoveolata* Melichar, by original designation.

Length of female 11.2-12.0 mm.

Head slightly produced, anterolateral margins broadly convex, apical margin truncate in dorsal view, median length of crown more than four-tenths interocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown with a median concavity between ocelli and a concavity on each side between ocellus and eye, surface without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with their anterior margins oblique and convex; clypeus convex, flattened medially, muscle impressions distinct, transclypeal suture obsolete medially, clypellus with contour of its lower portion more nearly horizontal than profile of remainder of face.

Thorax with pronotal width greater than transocular width of crown, lateral margins concave in dorsal view and strongly convergent anteriorly, dorsopleural carinae not attaining eye margin, disk without sculpturing, not pubescent; scutellum with portion behind transverse sulcus convex but without sculpturing. Forewing with inner two apical cells membranous, veins not elevated, not distinct, with three anteapical cells of which the bases are proximal to a transverse line through claval apex, with four apical cells and base of outermost more proximal than base of third; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula



FIGURES 205, 206.—205, *Orechona trifoveolata* Melichar (*i-k, m,* from specimen from Sto. Domingo de los Colorados, Ecuador; remainder from lectotype): *p,* Pygofer apex, left side, from caudal view; *q,* style, connective and membranous paraphyses, from dorsal view. 206, *O. superba* Melichar, lectotype: *p,* Forewing, outline (shaded portion sanguineous).

2:1:1:1 or 2:1:1; length of first tarsomere slightly greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly, posterior margin concave, macrosetae few, irregularly arranged on posterior half; pygofer process arising at ventral limit of posterior concavity, extending dorsally and medially, crossing its complement. Plates slender and triangular, gradually tapering, not extending posteriorly nearly as far as pygofer apex, macrosetae not uniseriate. Style extending posteriorly well beyond apex of connective, with an apicomesal angle. Aedeagus slender and elongate, curved gradually posterodorsally, bifid apically, with a pair of slender processes, shorter than shaft, arising ventrally on atrium, extending more strongly dorsally than shaft. Paraphyses vestigial (fig. 205*q*) in lectotype of *O. trifoveolata* Melichar.

Female abdominal sternum VII slightly produced and with posterior margin broadly convex, slightly notched medially (*trifoveolata*), or not. Second valvulae of ovipositor each with dorsal margin strongly convex in portion beyond basal curvature and bearing numerous regular primary teeth almost to apex, the primaries sloping and bearing small secondary denticles, with anteapical dorsal and posteroventral denticles. Pygofer well produced with posterodorsal margin obliquely truncate and posteroventral margin slightly sinuate, macrosetae sparse, located before apex, parallel to posteroventral margin, and on latter.

Species of *Orechona* Melichar are blunt-headed with the apex of the head slightly concave in dorsal view, with the pronotum wider than the head and with concave lateral margins. The genus is known only from Ecuador and Brazil.

Orechona resembles *Chichahua*, new genus, in the contour of the crown, and in the form of the abdominal sternum VII of the female. The styles and connective of *O. trifoveolata* Melichar are very close to *C. stygiana*, new species. The paraphyses, present or absent in *Chichahua*, are vestigial in the only male of *Orechona* studied. The genera are readily separable on the 2:1:1 hind femoral setal formula (2:0:0 in *Chichahua*) and the convex clypeus (concave in *Chichahua*) of *Orechona*.

I have seen only the male lectotype and two additional females of *O. trifoveolata* and the female lectotype of *O. superba* Melichar. The last was not at hand when the above description was written, and no key to species was possible as a result. The texture of the forewings of *trifoveolata* is coriaceous and opaque in the two females at hand, not subhyaline as in the original description.

SPECIES OF *ORECHONA*

superba Melichar, 1926a:346. Brazil.
trifoveolata Melichar, 1926a:346. Ecuador.

35. Genus RHOPALOGONIA Melichar

Figure 207

Rhopalogonia Melichar, 1926a:341. Type-species: *Tettigonia scita* Walker, 1851b:753, by subsequent designation of China, 1938d:183.

Length of male 10.0-10.6 mm, of female 10.5-10.7 mm.

Head slightly produced, median length of crown from slightly less than one-half to slightly greater than one-half interocular width and from slightly less than three-tenths to slightly more than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown with a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus convex, muscle impressions distinct, face without conspicuous pubescence, transclypeal suture interrupted, clypellus not strongly produced, its contour continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae not quite attaining posterior eye margin, disk transversely rugose, not pubescent; scutellum not striate behind transverse sulcus. Forewing with membrane usually not well delimited, veins distinct, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins, texture translucent and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of second and third tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer slender and moderately produced, posterior margin broadly convex with a group of numerous macrosetae on apical third and extending anterobasally parallel to posteroventral margin. Plates elongate, slender, extending posteriorly much beyond pygofer apex, with sparse multiseriate small macrosetae, apices acute. Style extending much farther posteriorly than apex of connective, without a preapical lobe, acute apically. Connective short Y-shaped, keeled. Aedeagus short, curved slightly dorsally, with a dorsal unpaired process. Paraphyses present, stalked, with slender elongate rami. Anal tube with an anteapical ventral process.

Female abdominal sternum VII with posterior margin produced laterally on each side, with a broad median shallow emargination within which median portion is obtusangularly produced. Ovipositor with second valvulae each broadened beyond basal curvature and with sloping quadrate primary teeth bearing minute secondary denticles, the primaries succeeded by a number of small anteapical teeth, apex sharply rounded, apicoventral margin without teeth. Pygofer without setae.

The genus *Rhopalogonia* Melichar includes only the type-species, of which a number of specimens from Venezuela have been examined. One specimen in

the Moravian Museum with a "Rio Janeiro" label is possibly mislabeled. Specimens in the USNM were collected on corn and sugar cane.

The relationship of *Rhopalogonia* to other genera is obscure. I have placed it in a group of genera related to *Dilobopterus* Signoret, but the evidence is weak. The shape of the head, the styles and connective of the male, and the dorsal process of the aedeagus occur in *Dilobopterus*, but are not general in that genus, and each of these features occurs elsewhere in genera unrelated to each other or to *Dilobopterus*. *Rhopalogonia* females do not have the second valvulae of the ovipositor closely similar to *Amblyscartidia*, new genus; *Dilobopterus*; and *Lissoscarta* Stål. The elongate, acute plates of *Rhopalogonia*, the protuberance of the tenth abdominal segment, and the lack of setae on the female pygofer are characters which set the genus apart from the foregoing series of genera.

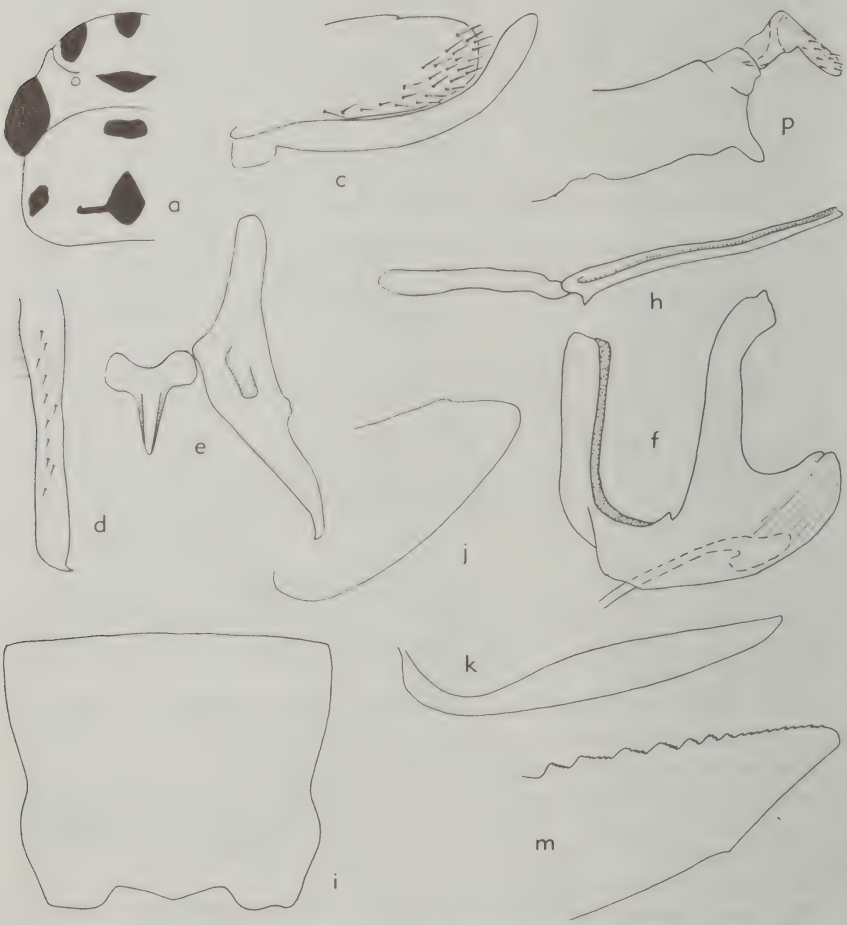


FIGURE 207.—*Rhopalogonia scita* (Walker) (specimens from El Valle, Venezuela; *h* from lateral view): *p*, Anal tube from lateral view.

The identity of the type-species, *Tettigonia scita* Walker rests on a comparison of the genitalia of a male compared with holotype and with the illustrations published here.

36. Genus SPHAEROPOGONIA Breddin

Figures 208-210

Sphaeropogonia Breddin, 1901f:100. Type-species: *Sphaeropogonia aureatula* Breddin, by subsequent designation of Melichar, 1926a:337.

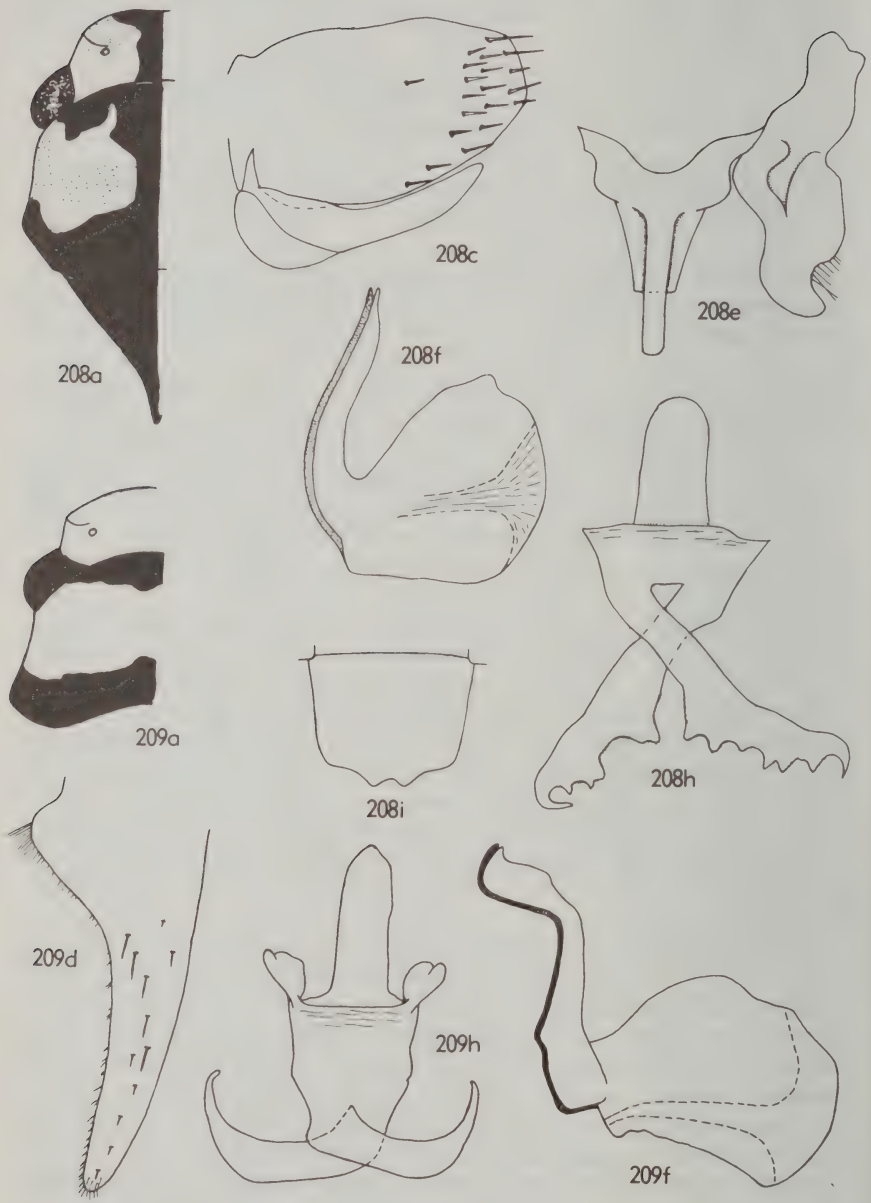
Length 15.5-16.5 mm.

Head moderately produced, median length of crown from one-third to one-half interocular width and from slightly more than one-fifth to slightly more than one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line, crown convex without a transverse concavity between ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins rectilinear and oblique; clypeus very slightly flattened medially, muscle impressions distinct, without pubescence, transclypeal suture obsolete at middle, clypellus not strongly convex, in profile with its contour continuing that of clypeus.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk transversely rugose, not pubescent; scutellum not striate behind transverse sulcus. Forewing without a membrane, veins indistinct, not elevated, with four apical cells, the base of fourth slightly more proximal than base of third, without an anteapical plexus of veins, texture opaque and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; or 2:1:1:1; length of first tarsomere greater than combined length of second and third tarsomeres, with two longitudinal rows of small setae on plantar surface and several setae between the rows at the apices.

Male genitalia: Pygofer moderately produced, posterior margin regularly convex with few macrosetae near posterior margin. Plates fairly short, triangular, not extending as far posteriorly as pygofer apex, each with multiseriate short macrosetae. Style extending as far posteriorly as apex of connective or not, with preapical lobe. Connective Y-shaped, the arms widely divergent. Aedeagus symmetrical, short, laterally compressed, with width of shaft greater than half its length, without processes. Paraphyses present, arising from a broad common base, the arms crossed apically.

Female abdominal sternum VII with posterior margin slightly produced and concavely truncate. Genital chamber without sclerites in dorsal membrane. Ovipositor with second valvulae each broadened throughout length beyond basal curvature, with regular angular teeth on dorsal margin extending almost to apex, apex rounded, apicoventral margin with very fine denticulations. Pygofer with few anteapical macrosetae and few on and near posteroventral margin.



FIGURES 208, 209.—208, *Sphaeropogonia aureatula* Breddin (*a, i,* from specimen from Ecuador labeled "cotype" in BM; remainder from Sta. Cecilia, Ecuador; *h* from dorsal view). 209, *S. facula* Breddin (from specimen from Tingo María, Peru; *h* from dorsal view).

Specimens belonging to *Sphaeropogonia* occur in Ecuador, Peru, and Bolivia. I have been unable to suggest close relationships between this genus and others.

The male and female genitalia of species of *Sphaeropogonia* are closely similar interspecifically, only *S. facula* Breddin differing from the other species in enough genitalic features to make these structures useful for identification of species, as the latter are interpreted here. For this reason, and because series available have been short, a dark-winged form which differs externally slightly from the orange-winged *S. miniatula* Jacobi is not described here.

SPECIES OF *SPHAEROPOGONIA*

aureatula Breddin, 1901f:101. Ecuador.
facula Breddin, 1901f:101. Peru.
miniatula Jacobi, 1905c:172. Peru, Bolivia.

KEY TO SPECIES OF *SPHAEROPOGONIA*

1. Crown and pronotum with some yellow markings ..... *aureatula* Breddin (fig. 208)
   Crown and pronotum orange marked with black, without yellow markings 2
2. Male with paraphyses not dentate; aedeagus with ventral margin concave in lateral view ..... *facula* Breddin (fig. 209)
   Male with paraphyses conspicuously dentate; aedeagus with ventral margin convex in lateral view ..... *miniatula* Jacobi (fig. 210)

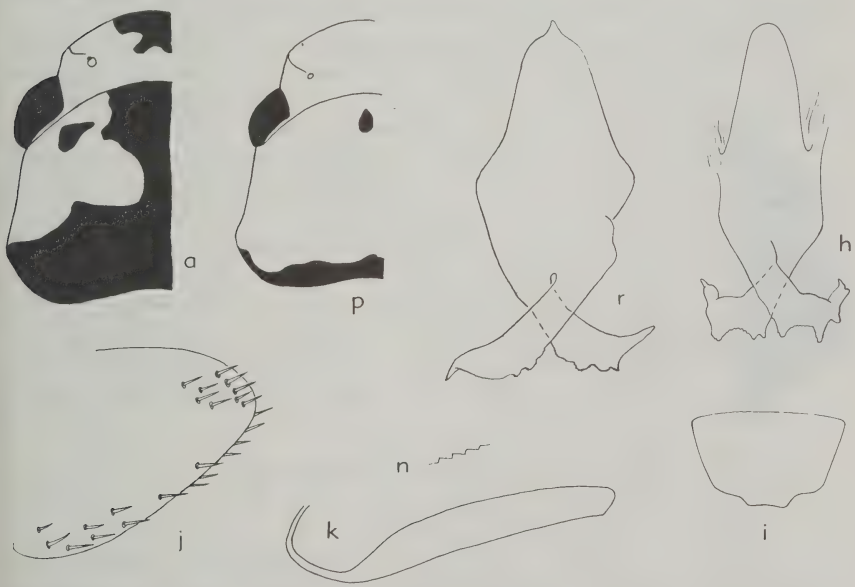


FIGURE 210.—*Sphaeropogonia miniatula* Jacobi (*p* from specimen from Río Santiago, Peru; *r* from Rurrenabaque, Bolivia; remainder from Pachitea, Peru; *h* from dorsal view): *p*, Anterior dorsum; *r*, paraphyses from ventral view.

37. HANSHUMBA, NEW GENUS

FIGURE 211

Type-species: *Hanshumba brasura*, new species.

Length 6.3-6.8 mm.

Head moderately produced with anterior margin angular, median length of crown from two-thirds to slightly more than seven-tenths interocular width and slightly less than one-half transocular width, ocelli in line with anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, crown with disk distinctly concave and without sculpturing or setae, minutely punctate behind apex, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins slightly oblique and varying from rectilinear to convex; clypeus flattened medially, muscle impressions not distinct, clypellus with profile continuing that of remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae oblique and complete, posterior margin shallowly concave, disk transversely rugulose; scutellum not or only obscurely striate behind transverse sulcus. Forewing with membrane including all of apical cells and extending proximally along costal margin, veins not very distinct, with three anteapical cells of which bases are proximal to claval apex, with four apical cells of which base of outermost is more proximal than base of third. Hindleg with femoral setal formula 2:1:1; length of basal tarsomere slightly greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly with posterior margin broadly convex, with macrosetae and microsetae on posterior half; pygofer

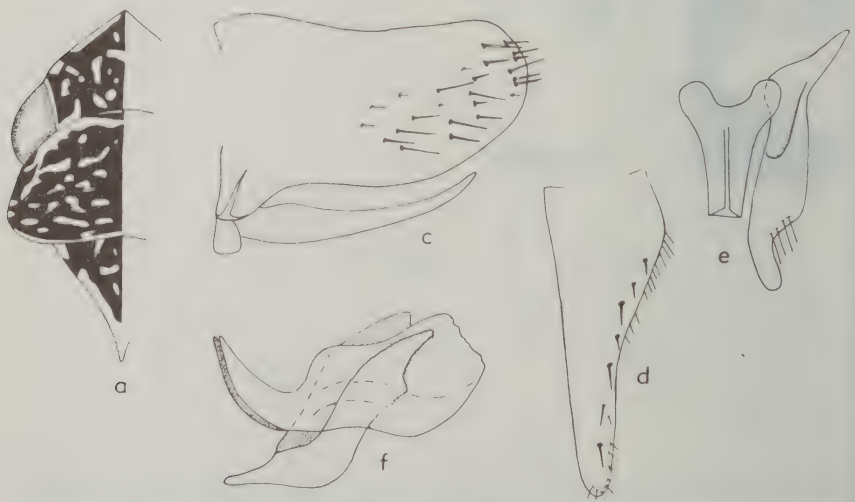


FIGURE 211.—*Hanshumba brasura*, n. sp., holotype; *f*, Aedeagus and paraphyses, from lateral view.

processes absent. Plates short, triangular, gradually tapered, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae. Style extending posteriorly beyond apex of connective, with preapical lobe, narrowly rounded apically. Aedeagus short, broad, gonopore anteapical and ventral. Paraphyses short-stalked, the rami not extending to apex of aedeagus.

Female abdominal sternum VII with posterior margin regularly and shallowly concave. Genital chamber with a pair of small sclerites near gonopore. Ovipositor with second valvulae each bearing primary teeth dorsally in approximately three-fourths distance beyond basal curvature, teeth broader at base, progressively narrower apically, all of the teeth with secondary denticles, apex acute, ventral margin convex in apical half. Pygofer bluntly rounded posterodorsally, with short macrosetae near apical and posteroventral margins (the pygofer and second valvula are much as in the illustrations of *Vidanoana*, new genus (figs. 874*j* and 874*k*), except that the apex of the latter is blunter, like the apex illustrated for *Helocharina gayi* (Spinola) (fig. 498*m*); the apex of the seventh sternum is like the illustration of *Versigonalia ruficauda* (Walker) (fig. 881*i*)).

I have placed *Hanshumba*, new genus, near *Eldarbala*, new genus, the only species of which is somewhat similarly marked, but the relationship is not close. In males of *E. scrutator*, the head is more acute, the plates are shorter, the styles are prominently lobed anteapically, and the paraphyses are asymmetrical, all of which differ from *Hanshumba*. Females of *Eldarbala* are not known.

Hanshumba brasura, NEW SPECIES

FIGURE 211

Structural characters as in generic description. Crown black with irregular yellow, mostly longitudinal, vermiculations; pronotum mottled black and yellow with the pattern usually transverse; scutellum yellow and black, consistently with a black triangular spot on basal marginal area near outer basal angle, and a yellow border on posterior half; forewings yellow and black from bases to apical cells, longitudinal veins of corium black, remainder spotted and vermiculate with yellow; face, legs, and propleura yellow except a dark spot below dorsopleural carina on proepimeron.

Holotype male and one female, Hansa Humboldt, Santa Catharina, Brazil, 50° W. longitude, 26° S. latitude, 100 m, February, 1930 (BM). Two females, Hansa, Brazil (ZIL). One female, Brazil (Museo La Plata).

38. ELDARBALA, NEW GENUS

FIGURE 212

Type-species: *Eldarbala scrutator*, n. sp..

Length of male 9.0-9.6 mm, female unknown.

Head strongly produced with anterior margin acutangular, median length of crown equal to or slightly greater than interocular width and from six-tenths to slightly more than two-thirds transocular width, ocelli located

behind a line between anterior eye angles, each very slightly closer to adjacent anterior eye angle than to median line of crown, crown with disk very slightly concave and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and slightly convex; face with a short acute thornlike protuberance dorsally, clypeus flattened, muscle impressions not distinct, clypellus with a slight convexity at base, otherwise with profile continuing that of remainder of face.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae oblique and incomplete, posterior margin shallowly concave, disk transversely rugulose; scutellum weakly striate behind transverse sulcus. Forewing without a membrane, veins not elevated but longitudinal veins distinct in color from remainder of wing surface, with three anteapical cells of which the bases are proximal to claval apex; with four apical cells of which base of outermost is more proximal than base of third. Hindleg with femoral setal formula 2:1:1; length of basal tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

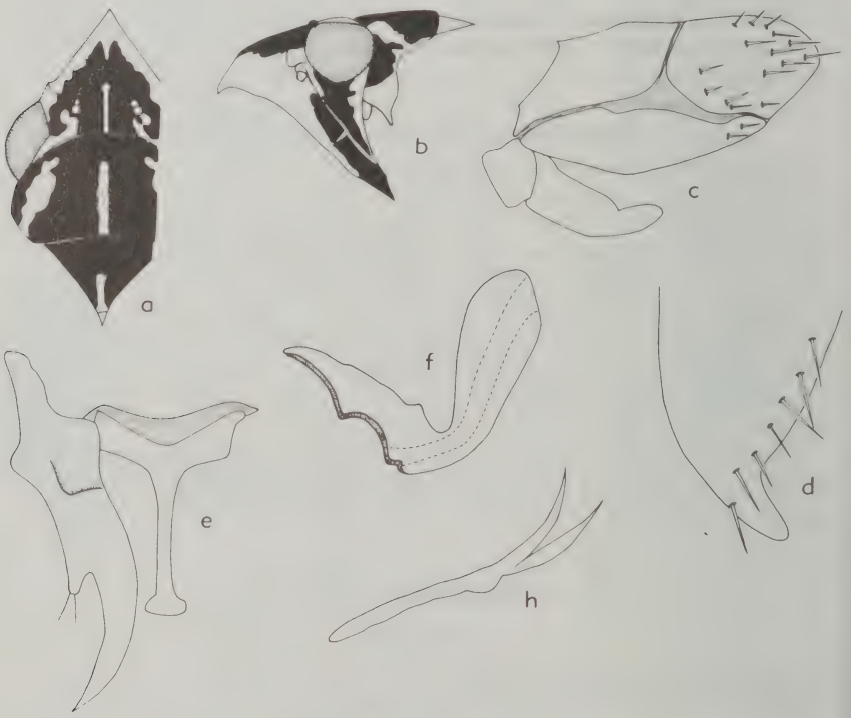


FIGURE 212.—*Eldarbala scrutator*, n. sp. (specimen from La Florida, Peru; *h* from lateral view).

Male genitalia: Pygofer strongly produced posteriorly, narrowly rounded posterodorsally, with a number of macrosetae on posterior half; pygofer processes absent. Plates short, triangular, abruptly narrowed anteapically, not extending posteriorly nearly as far as pygofer apex, each with uniseriate macrosetae. Style extending posteriorly beyond apex of connective, with a conspicuous preapical lobe, acute apically. Aedeagus short, shaft subovate in lateral view, without processes. Paraphyses long-stalked, the rami asymmetrical.

Female unknown.

Eldarbala is known only from Peru. The relationship of this genus to other Western Hemisphere genera isn't clear. The area of flexion in the middle portion of the pygofer on each side (fig. 212*c*) considered with the incomplete dorsopleural carinae of the thorax are suggestive of some Old World genera. These features, and the acute apex of the head will separate *Eldarbala* readily from other genera included here.

Eldarbala scrutator, NEW SPECIES

FIGURE 212

Structural characters as in generic description, and with a membranous area of flexion on male pygofer extending from its basiventral angle posterodorsally to middle of disk where it branches, one arm extending dorsally, the other posteroventrally.

Color of dorsum black with following greenish yellow markings; anterolateral margins, apex, a median stripe and a small curved spot on basal margin on each side of crown; a narrow median stripe on posterior two-thirds and a broader diagonal stripe on each side of pronotum; a short median apical stripe on scutellum; and the longitudinal veins of the forewings before the apical cells. Face yellow with a broad black stripe on each side below eye, converging at clypellar apex; propleura yellow marked with black; legs stramineous.

Holotype male, Pucara, March 29, 1967, "S. Paz, Lomas"; and one additional male, La Florida, May 6, 1967 (C. Korytkowski) (USNM).

Of the several localities called "Pucara" in Peru, this is probably the one in Puno Province.

39. GENUS PAROMENIA MELICHAR

FIGURES 213-231

Paromenia Melichar, 1926a:342. Type-species: *Tettigonia rufa* Walker, by subsequent designation of China (1938d:183).

Alocha Melichar, 1926a:342. Type-species: *Tettigonia sordida* Signoret, by subsequent designation of China (1938d:183). New synonymy.

Scarisana Metcalf, 1949b:277. Type-species: *Scarisana variabilis* Metcalf, by original designation. New synonymy.

Length 10.1-16.0 mm.

Head moderately produced, crown with median length from four-tenths to six-tenths interocular width and from three-tenths to four-tenths transocular width, anterior margin broadly rounded, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each usually about equidistant from adjacent anterior eye angle and median line of crown, surface of crown convex or with a transverse concavity before ocelli, always with a concavity laterad of each ocellus, surface without sculpturing or setae, lateral clypeal sutures extending onto crown, and attaining ocelli or not; antennal ledges with anterior margins usually oblique and convex in lateral view; face convex, flattened, or with clypeus slightly concave, muscle impressions distinct or not, without pubescence, transclypeal suture obsolete.

Pronotum wider than head, lateral margins convergent anteriorly, dorsopleural carinae complete, hind margin convex or concave, disk without pubescence; scutellum without transverse striations. Forewing with or without a membrane, variable in extent when present, veins not elevated, often indistinct, with four apical cells of which the base of fourth is more proximal than base of third, usually without an anteapical plexus of veins, texture subhyaline to weakly coriaceous; wings of female at rest exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length greater than, equal to, or less than combined length of second and third tarsomeres, with two longitudinal rows of very short weak setae on plantar surface.

Male genitalia: Pygofer moderately to strongly produced, macrosetae occurring in definite groups, occasionally with additional microsetae, with processes present or absent, arising on dorsal or posterior margin when present. Plates usually triangular, separate throughout their length, length in relation to pygofer variable interspecifically, with macrosetae usually serially arranged, often with numerous microsetae in addition to macrosetae. Style extending farther posteriorly than apex of connective, usually with preapical lobe, nearly always truncate apically, often with apical portion foot-shaped. Connective usually in form of transverse bar with a strong median carina extending dorsally or anterodorsally. Aedeagus with shaft usually rather elongate, usually with apical and occasionally with anteapical processes, base articulated with connective. Paraphyses absent.

Female abdominal sternum VII well produced and usually truncate or slightly emarginate at apex. Ovipositor with second valvulae each bearing teeth on most of dorsal margin beyond basal curvature, the teeth separated by toothless intervals, apex rounded dorsally, apicoventral denticles present. Pygofer with macrosetae elongate and distributed over apical two-thirds.

Specimens of *Paromenia* range in color from golden, to dull sordid brown.

Paromenia ranges from Guatemala to Bolivia and southeastern Brazil. The genus is part of the group of genera that includes *Onega* Distant, *Dasmeusa* Melichar, *Jozima*, new genus, *Baleja* Melichar, *Parathona* Melichar, *Sailerana*, new genus, and *Tacora* Melichar. Species of *Paromenia* have no carina at the transition from crown to face, as do *Onega* species. Distinguishing characters of the other genera are discussed below in the respective treatments.

PAROMENIA GENERIC GROUP

39. Paromenia
40. Onega
41. Dasmeusa
42. Jozima
43. Baleja
44. Lebaja
45. Parathona
46. Sailerana
47. Tacora
48. Punahuana
49. Backhoffella

The present identification of *Tettigonia auroguttata* Signoret rests on a dissection of the male lectotype. This species exhibits a considerable amount of variation in pygofer, style apex, and aedeagus, some of which is illustrated. There is a possibility that a species complex is involved. The lectotype of *T. icterica* Signoret also falls within the limits of *auroguttata* as presently interpreted. *T. caicus* Walker is known only from the female lectotype, from Rio de Janeiro.

There is a possibility that *Aulacizes isabellina* Fowler, as interpreted here, is a species complex. The male lectotype has been dissected as have the male lectotype of *Tettigonia erumpens* Fowler and of *T. spectralis* Fowler. The present interpretation of *T. rufa* Walker rests on the male lectotype of that species, as does the identity of *T. sordida* Signoret. The identity of *Aulacizes splendidula* Osborn is based on a male paratopotype from the Carnegie Museum.

No specimens of *Tettigonia macroptera* Latreille have been seen by the writer, but the species was correctly placed in *Paromenia* by Metcalf (1965a:258), judging from the original illustrations.

Tettigonia pellucida Signoret is known only from the female lectotype of *Tettigonia longipes* Walker from Quito, Ecuador. The head of the lectotype is more deltoid than usual for the genus, and the writer has not been able to find other specimens to correspond to that type in this character.

SPECIES OF *PAROMENIA*

auroguttata (Signoret), 1853b:373 (*Tettigonia*). Venezuela, Ecuador, Peru, Bolivia, N. and SE. Brazil.

icterica (Signoret), 1855d:781 (*Tettigonia*). New synonymy.

caicus (Walker), 1862a:318 (*Tettigonia*). SE. Brazil. New combination.

clarkei, n. sp. Colombia, Peru.
falcata, n. sp. Ecuador, Peru.
intacta (Walker), 1851b:746 (*Tettigonia*). Colombia, Venezuela. New combination.
isabellina (Fowler), 1899a:217 (*Aulacizes*). Mexico, Guatemala, Costa Rica, Panama, Colombia, Bolivia. New combination.
erumpens (Fowler), 1899e:256 (*Tettigonia*). New synonymy.
spectralis (Fowler), 1899e:256 (*Tettigonia*). New synonymy.
lugubris, n. sp. Venezuela.
macroptera (Latreille), 1811b:57 (*Tettigonia*).
maculosa, n. sp. Ecuador.
marginata, n. sp. Peru.
pellucida (Signoret), 1853b:373 (*Tettigonia*) (new name). Ecuador.
longipes (Walker), 1851b:748 (*Tettigonia*) (secondary homonym).
propria, n. sp. Br. and Fr. Guiana.
quimbayensis (Kuhlgatz and Melichar), 1902a:252 (*Tettigonia*). Peru, Bolivia.
splendidula (Osborn), 1926a:168 (*Aulacizes*). New synonymy.
rimacensis, n. sp. Peru.
rossi, n. sp. Brazil, Peru.
rufa (Walker), 1851b:742 (*Tettigonia*). Colombia, Venezuela, Ecuador, Peru.
signata, n. sp. Br. and Fr. Guiana.
sordida (Signoret), 1855d:781 (*Tettigonia*). The Guianas, E. Brazil. New combination.
variabilis (Metcalf), 1949b:277 (*Scarisana*). New synonymy.
stewartae, n. sp. Peru.
venata, n. sp. Colombia, Venezuela.
weyrauchi, n. sp. Peru.
zapala, n. sp. Bolivia.

KEY TO MALES OF *PAROMENIA*

(*Paromenia macroptera* (Latreille), *P. caicus* (Walker), and *P. pellucida* (Signoret) not included).

1. Pygofer with processes, or concave apically 2
   Pygofer without processes, not concave apically 8

2. Pygofer processes short, broad, and truncate apically 3
   Pygofer processes narrow, cylindrical if truncate, usually tapered and acute at apex 4

3. Aedeagus with short lobate paired processes near base, without an apical process (French Guiana) ..... *propria*, n. sp., page 282
   Aedeagus with paired slender digitate lateral processes near midlength, with a slender acute apical process (Peru) ..... *rossi*, n. sp., page 282

4. Aedeagus with paired, sclerotized, symmetrical processes *sordida* (Signoret) (fig. 215)
   Aedeagus not so 5

5. Pygofer apex concave in lateral view ..... *falcata*, n. sp., page 281
   Pygofer not so 6

6. Pygofer process bearing an angular anteapical elevation *zapala*, n. sp., page 279
   Pygofer process without such an elevation 7

7. Pygofer process extending beyond pygofer margin
isabellina (Fowler) (fig. 218)
Pygofer process concealed in lateral view, not attaining apical pygofer margin ..... *maculosa*, n. sp., page 277

8. Plates very short and broad (fig. 220*d*); style apex very broadly expanded
marginata, n. sp., page 275
Plates slender and triangular; style much less or not at all expanded 9

9. Aedeagus without processes ..... *stewartae*, n. sp., page 277
Aedeagus with at least one sclerotized process 10

10. Aedeagus with a broad, toothed dorsal process near midlength
venata, n. sp., page 273
Aedeagus not so 11

11. Aedeagus with a slender, submembranous dorsal process in basal half
signata, n. sp., page 273
Aedeagus not as above 12

12. Forewings tan with cream colored markings at least on corium
quimbayensis (Kuhlgatz and Melichar) (fig. 224)
Forewings not as above 13

13. Pygofer in lateral view with a short dorsoapical projection
rufa (Walker) (fig. 225)
Pygofer not as above 14

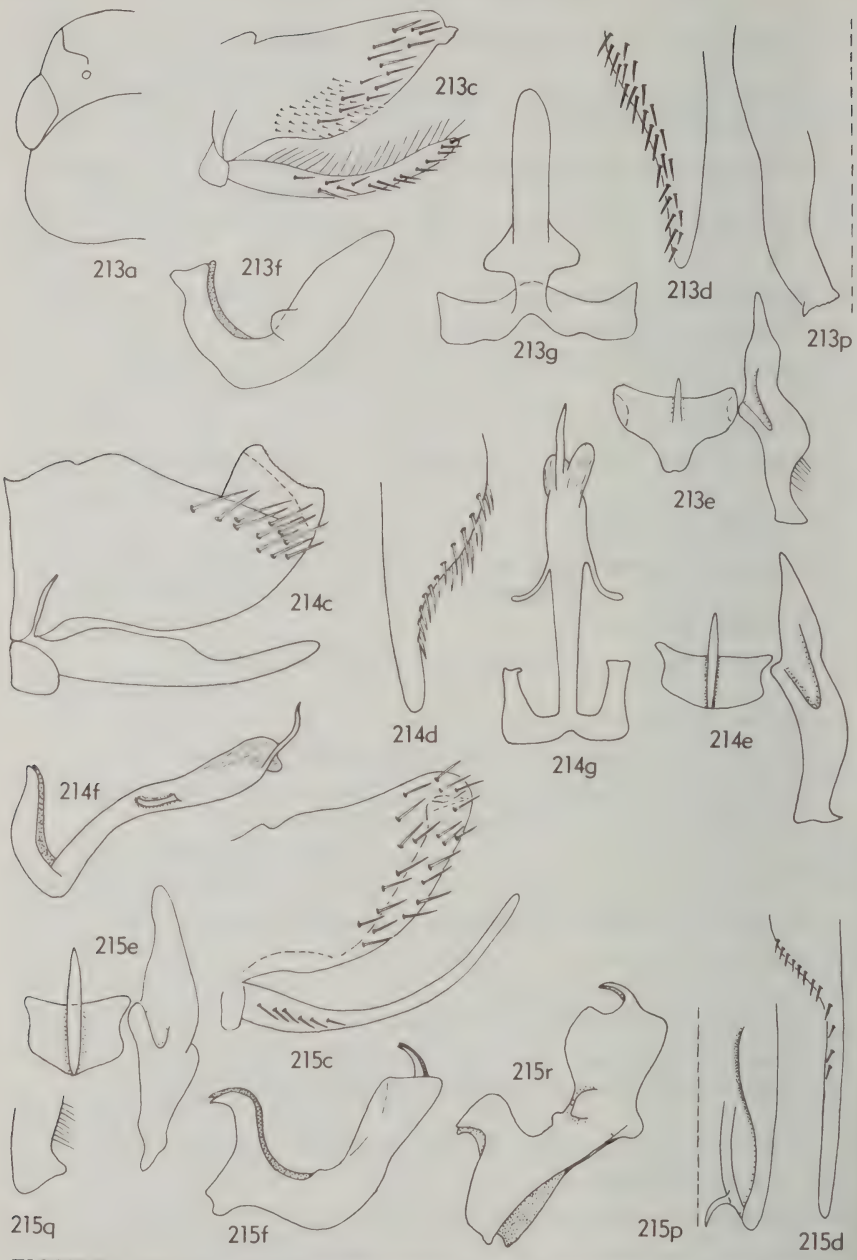
14. Aedeagus with paired apical strongly recurved processes
intacta (Walker) (fig. 226)
Aedeagus with single apical process which is not recurved 15

15. Aedeagus with length of apical process more than one-half length of shaft ..... *clarkei*, n. sp., page 271
Aedeagus with length of apical process much less than half length of shaft 16

16. Forewing with a plexus of veins ..... *rimacensis*, n. sp., page 284
Forewing without a plexus of veins 17

17. Style broadly expanded apically (fig. 229*e*), aedeagus usually with apical one-half or more of gonoduct membranous
auroguttata (Signoret) (fig. 229)
Style much less expanded apically (fig. 230*e*), aedeagus without membranous gonoduct 18

18. Aedeagus with apical process not median; specimens dull brown
lugubris, n. sp., page 269
Aedeagus with apical process median; specimens yellow, partly tinged with orange ..... *weyrauchi*, n. sp., page 269



FIGURES 213-215.—213, *Paromenia propria*, n. sp. (from specimen from French Guiana): *p*, Male pygofer apex, left side, from dorsal view. 214, *P. rossi*, n. sp., holotype. 215, *P. sordida* (Signoret) (*c*, *f*, *p*, from specimen from Rio Autaz, Amazonas; remainder from British Guiana): *p*, Male pygofer apex, right side, from dorsal view; *q*, style apex from lateral view; *r*, aedeagus from lateral view.

Paromenia lugubris, NEW SPECIES

FIGURE 230, PAGE 283

Length of male 11.5 mm, of female 11.6 mm. Head with median length of crown equal to or slightly greater than one-half interocular width and one-third transocular width, anterior margin without a carina at transition from crown to face, without a transverse concavity before ocelli, lateral clypeal sutures attaining ocelli; antennal ledges with anterior margins obliquely convex in lateral view; face strongly convex, muscle impressions not very distinct. Pronotum with hind margin slightly convex; forewing without a membrane, translucent, the veins occasionally darkened, without an anteapical plexus of veins; first hind tarsomere with length approximately equal to combined length of second and third tarsomeres. Male with pygofer not strongly produced, posterior margin broadly rounded, macrosetae irregularly arranged in a narrow anteapical group extending from dorsal to ventral margin, without processes; plates triangular, not extending as far posteriorly as pygofer apex, with macrosetae serially arranged; style much less broadly expanded at apex than usual in the genus; connective a transverse bar with a weak median carina; aedeagus with shaft slender, with a short apical process which is not median. Female abdominal sternum VII with posterior margin nearly transverse, with a narrow, shallow median excision. Other structural characters as in generic description.

Color dull brown, posterior two-thirds of pronotal disk, a claval spot adjoining each basal scutellar angle and apical portion of scutellum yellow; apical portion of posterior tibiae and posterior tarsomeres black.

Holotype male labeled: "Venezuela Exp.; Territ. Amazonas; Mt. Marahuaca, N. Slopes, Benitez; Camp, May 1-25, 1950" (J. Maldonado Capriles) and one female, same data (USNM).

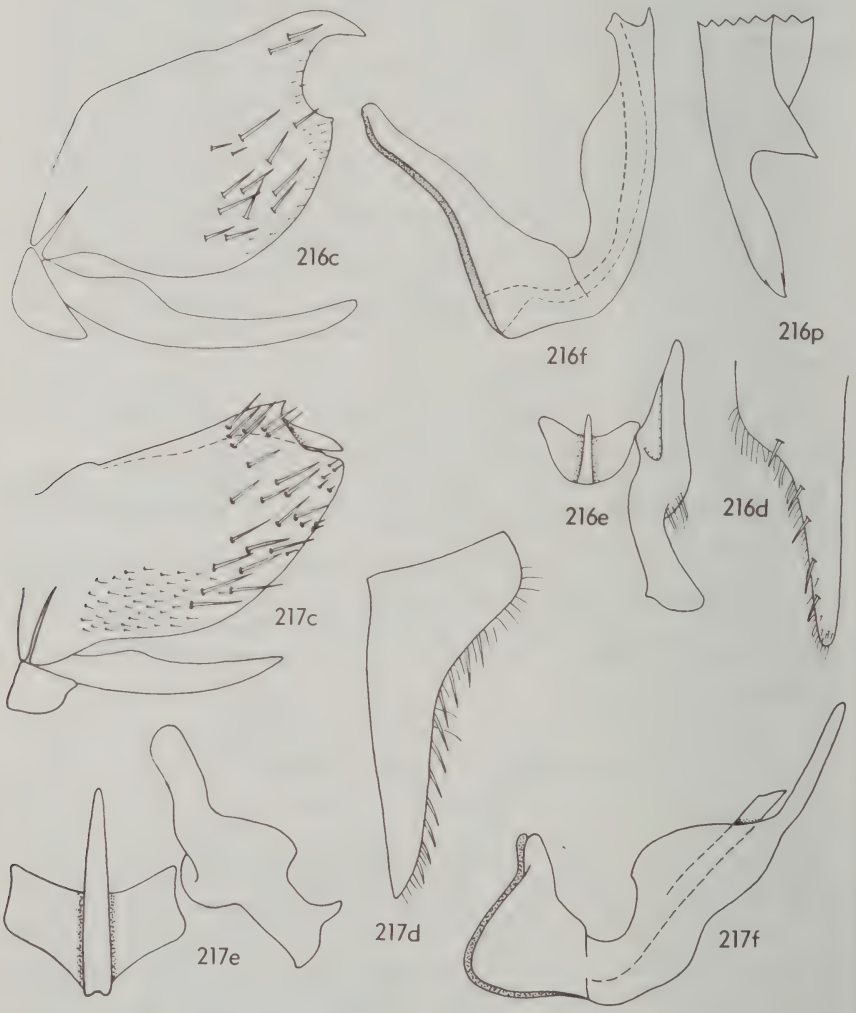
P lugubris, n. sp., is closely related to *P. auroguttata* (Signoret) from which it may be distinguished readily by its style apex which is less expanded and the carina of the connective which is less pronounced than in *auroguttata*. The apical aedeagal process is also shorter and more asymmetrical than in *auroguttata*.

Paromenia weyrauchi, NEW SPECIES

FIGURE 231, PAGE 283

Length of male 12.5-13.3 mm, of female 13.6 mm. Head with median length of crown varying from less than six-tenths to slightly greater than six-tenths interocular width, and from slightly less than four-tenths to slightly greater than four-tenths transocular width, with a slight transverse concavity before ocelli. Pronotum with posterior margin varying from slightly convex to slightly concave; forewing without a membrane, opaque, the veins not darkened, without an anteapical plexus of veins; first posterior tarsomere with length slightly greater than combined length of two more distal tarsomeres. Male with pygofer moderately produced, posterodorsal margin narrowly

rounded, macrosetae numerous, irregularly arranged on posterior half of disk, pygofer without processes; plates slender and triangular, not extending posteriorly as far as pygofer apex, with uniseriate macrosetae; style very slightly expanded at apex; connective a transverse bar with a strong median carina; aedeagus long and slender with an apical sclerotized process, without lateral processes. Female abdominal sternum VII produced with posterolateral margins oblique, with a median apical shallow notch.



FIGURES 216, 217.—216, *Paromenia falcata,* n. sp. (from specimen from Santo Domingo, Ecuador): *p,* Male pygofer apex, left side, from caudal view. 217, *P. zapala,* n. sp., holotype.

Color of dorsum yellow, weakly tinged with orange on crown and pronotum. Face, thoracic pleura, and legs, yellow, variably tinged with orange.

Holotype male, Tingo María, Peru, October, 1946 (W. Weyrauch); one specimen without abdomen, Tingo María, Huánuco, Peru, July 5, 1962 (W. T. Van Velzen); one male Callao, Peru (Mrs. J. Pusey), and one female San Domingo de los Colorados, Pichincha, Ecuador, February 6, 1958, 2,000 ft. (R. W. Hodges) (USNM).

P. weyrauchi, n. sp., is similar to *P. auroguttata* (Signoret) in the form of the aedeagus, but the styles are narrower at their apices, the male plates are narrower than in the latter species, and the chaetotaxy of the pygofer is different. The species is named in honor of the collector of the holotype.

Paromenia clarkei, NEW SPECIES

FIGURE 227, PAGE 278

Length of male 12.9-13.5 mm, of female 13.6-13.8 mm. Head with median length of crown varying from slightly less than to slightly more than one-half interocular width and from one-third to four-tenths transocular width, with a weak transverse concavity before ocelli; clypeus with muscle impressions distinct. Pronotum with hind margin varying from concave to slightly convex; forewing with membrane including all of inner apical cell, except a short area along outer margin near base, and apical portions of remaining apical cells; first hind tarsomere with length slightly greater than combined length of second and third tarsomeres. Male with pygofer well produced posteriorly, posterior margin more narrowly rounded than in *P. lugubris*, n. sp., with a vertical band of macrosetae on apical third of pygofer, a group of short stout setae between latter and posterior margin, and a number of microsetae on ventral half of pygofer; plates triangular, not extending as far posteriorly as pygofer apex, with macrosetae serially arranged; style apex much more broadly expanded than in *lugubris*; connective a transverse bar with a strong median carina; aedeagus in lateral view with shaft much broader than in *lugubris*, the apical process much longer and more aciculate. Female abdominal sternum VII keeled medially, posterior margin much as in *lugubris* but with median excision more regularly concave. Other structural characters as in *lugubris*.

Color tawny, nearly always with a poorly delimited smoky transcommissural area at claval apex, involving basal portion of inner apical cells with wings at rest.

Holotype male, Popayán, Cauca, Colombia, from an apple orchard January 9, 1959 (J. F. G. Clarke) and eight specimens, same data, (USNM). A long series of specimens of both sexes from W. of Cali, Colombia (CAS). This species is named in honor of the collector of the holotype.

P. clarkei, n. sp., is related to *P. lugubris*, n. sp., and to *P. auroguttata* (Signoret). *P. clarkei* can be distinguished in that its aedeagus in lateral view is much wider than either of the other two species (see illustrations).

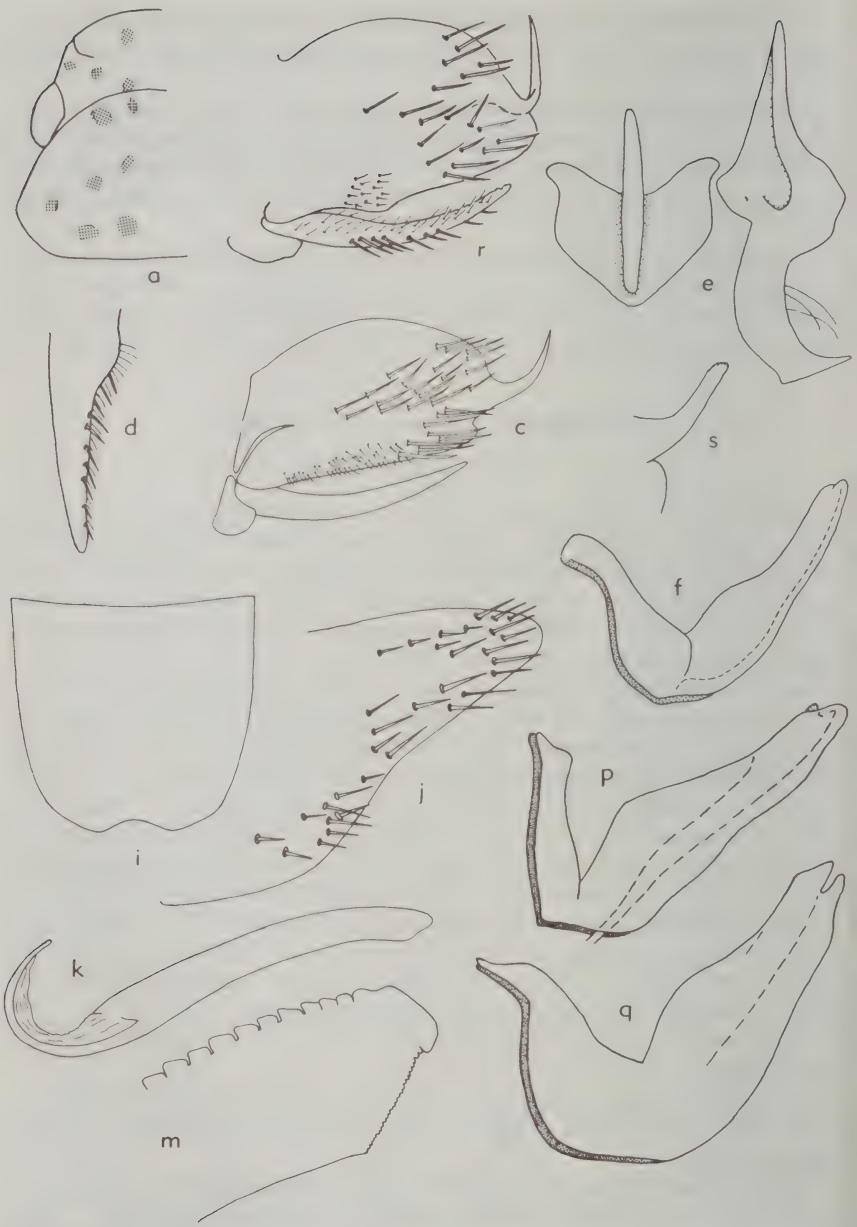


FIGURE 218.—*Paromenia isabellina* (Fowler) (*a* from specimen from Colombia; *c* from Guatemala; *d, p, q, r,* from Yepocapa, Guatemala; *e, f,* from Panama; *s* from Volcán, Panama; remainder from Maroni River, French Guiana): *p, q,* Aedeagus from lateral view; *r,* male pygofer from lateral view; *s,* pygofer process from lateral view.

Paromenia signata, NEW SPECIES

FIGURE 223, PAGE 276

Length of male 11.2-11.4 mm, of female 11.7-11.9 mm. Head with median length of crown slightly more than half interocular width and approximately four-tenths transocular width, with a slight transverse concavity before ocelli, lateral clypeal sutures usually not attaining ocelli; face with muscle impressions distinct. Forewing with appendix and extreme apical portion of inner two apical cells membranous; first hind tarsomere with length slightly greater than combined length of second and third tarsomeres. Male with pygofer moderately produced, posterior margin rounded, without processes, macrosetae irregularly arranged in a broad apical area; style with apex narrowly rounded, not expanded; aedeagus elongate, slender, with a short semimembranous somewhat digitate dorsal process on basal half of shaft, with a pair of asymmetrical apical processes, one of which is much longer than the other. Other structural characters of both sexes as in *P. lugubris*, n. sp.

Color of dorsum varying from dull brown to golden yellow, with a pink marking before apex of inner two apical cells of forewing, face and venter usually concolorous with dorsum, apical portions of posterior tibiae and tarsi occasionally darker.

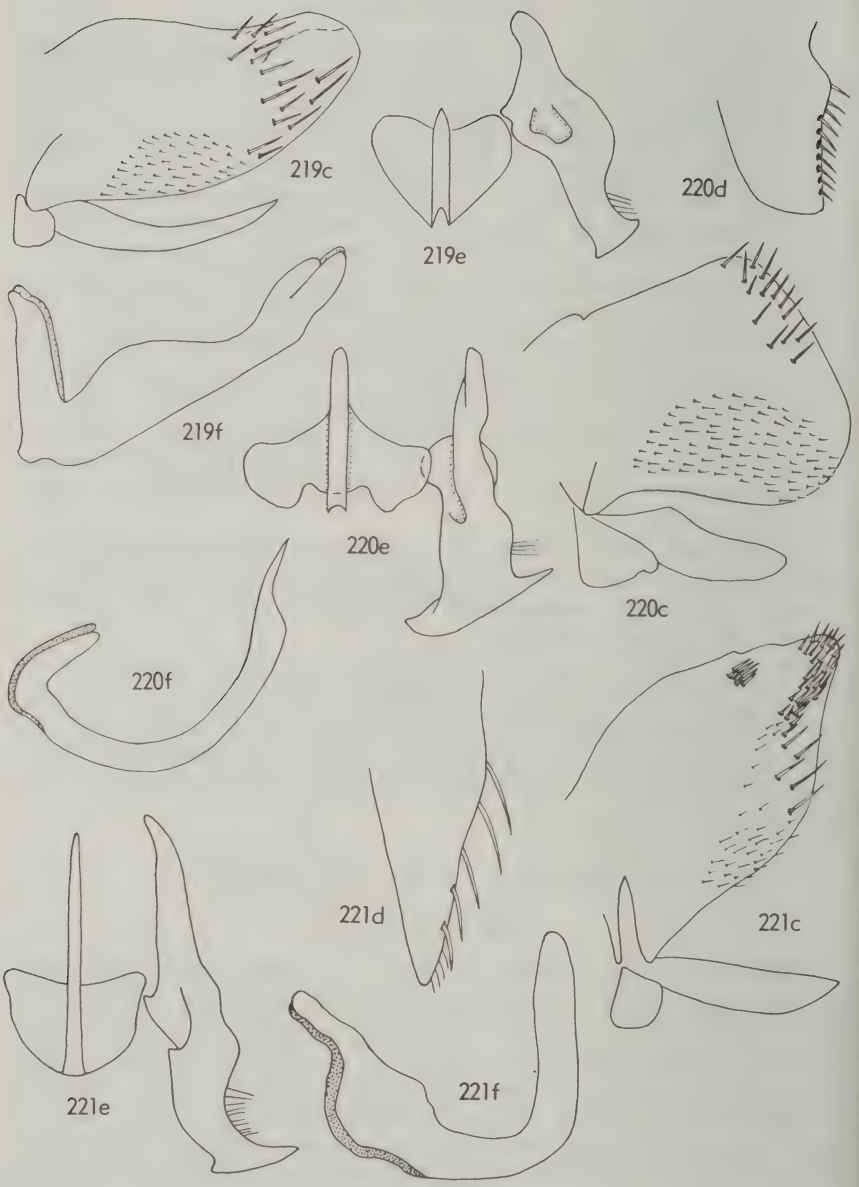
Holotype male, Maroni River, French Guiana on indefinite loan to USNM from NCS. A large number of additional specimens of both sexes from French Guiana (NCS). Four specimens from British Guiana (BM). Three specimens, St. Jean, Fr. Guiana (USNM).

Externally, *Paromenia signata*, n. sp., resembles *P. sordida* (Signoret) in size and color. It can usually be distinguished externally from the latter by the larger yellow area of the pronotum which is a narrower marginal band in the Signoret species. In the characters of the male genitalia, *signata* differs from all other species in the genus in the style apices which are gradually narrowed to narrowly convex apices.

Paromenia venata, NEW SPECIES

FIGURE 222, PAGE 276

Length of male 14.3-15.0 mm, of female 14.1-15.0 mm. Head with median length of crown equal to approximately six-tenths interocular width in male, slightly more than six-tenths interocular width in female, and from four-tenths (male) to slightly more than four-tenths (female) transocular width, crown with or without a transverse concavity before ocelli, lateral clypeal sutures attaining ocelli or not; face with muscle impressions distinct. Pronotum with hind margin convex or concave; forewing without a membrane, translucent, with an anteapical plexus of veins in both clavus and corium; first hind tarsomere with length greater than combined length of second and third tarsomeres. Male with pygofer well produced, with a dorsoapical undifferentially sclerotized lobe, posterior margin broadly rounded, macrosetae rather uniformly arranged in apical third; style foot-shaped apically; connective a transverse bar with a strong median carina; aedeagus in lateral aspect with a large



FIGURES 219-221.—219, *Paromenia maculosa*, n. sp., holotype. 220, *P. marginata*, n. sp. (from specimen from Sta. Isabel, Cuzco, Peru). 221, *P. stewartae*, n. sp. holotype.

strong dorsal projection at approximately midlength, the distal margin of the projection irregularly dentate, and a unilateral recurved apical process. Female abdominal sternum VII well produced with posterior margin convex, not emarginate medially. Other structural characters as in *P. lugubris*, n. sp.

Color of dorsum from sordid brown to pale yellow, the crown occasionally pink in the yellow specimens, with portion of plexus of veins parallel to costal margin always darker and conspicuous, venter approximately concolorous with dorsum, occasionally darker.

Holotype male, Los Canales, Naiguata, Distrito Federal (Colombia), September 24, 1938 (collector's name illegible), 720 m. (USNM). A long series of paratypes of both sexes from near Maracay, Venezuela (BZ).

P. venata, n. sp., is closely related to *P. rufa* (Walker) in the occurrence of a plexus of veins in the forewing and in the structure of the male pygofer, plates, style and connective. It differs markedly from all species in the genus in the bizarre form of the aedeagus.

Paromenia marginata, NEW SPECIES

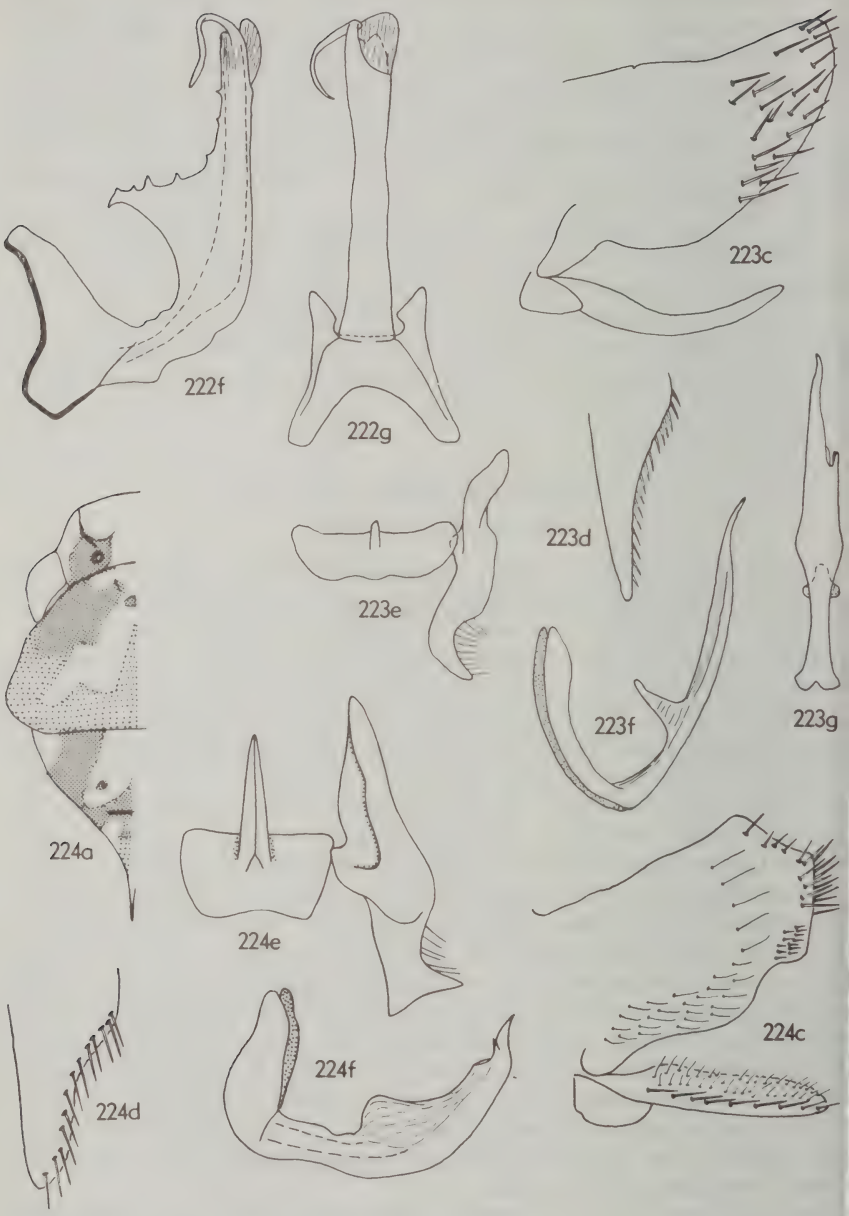
FIGURE 220, PAGE 274

Length of male 15.0-15.1 mm, of female 15.6-16.0 mm. Head with median length of crown from slightly more than half to more than six-tenths interocular width and approximately four-tenths transocular width, with a shallow transverse concavity before ocelli, lateral clypeal sutures usually attaining ocelli; face with muscle impressions distinct. Pronotum with hind margin rectilinear or weakly convex; forewing with membrane including apical portions of apical cells, texture translucent to opaque, occasionally with a few of the claval veins darker, without an anteapical plexus of veins; first hind tarsomere with length equal to, or greater than, combined length of second and third tarsomeres. Male with pygofer not strongly produced, obliquely truncate apically, macrosetae few and irregularly arranged in a narrow dorsoapical group, with a number of regularly arranged microsetae on ventral half of disk, pygofer without processes; plates short, broad, rounded apically; style much more expanded apically than is usual in the genus, with a strong median and a strong lateral apical projection; connective a transverse bar with a strong median carina; aedeagus with shaft slender, broadest near apex, with an apical slender acute process which is not median. Female abdominal sternum VII with posterior margin convex and with a narrow shallow median regularly concave excision. Other structural characters as in *P. lugubris*, n. sp.

Color tan to brownish yellow, forewing usually with few darkened veins near middle, claval apex black, apex of wing dark-bordered; face and venter usually concolorous with dorsum.

Holotype male and three females, Chinchaniago, Peru, one male from Chanchamayo, Peru and a series of specimens of both sexes from Santa Isabel, Cuzco, Peru (NCS). Holotype on indefinite loan to USNM.

P. marginata, n. sp., is probably more closely related to *P. auroguttata* (Signoret) than to any other species in the genus. It can be separated from all



FIGURES 222-224.—222, *Paromenia venata*, n. sp. holotype. 223, *P. signata*, n. sp. (from specimen from French Guiana). 224, *P. quimbayensis* (Kuhlgatz and Melichar) (from specimens from Bolivia; *c-f* from paratopotype of *Aulacizes splendidula* Osborn; darkly shaded portion of *a* is purple).

of the other species of *Paromenia* by its very expanded style apices and by its truncate pygofer apex.

Paromenia stewartae, NEW SPECIES

FIGURE 221, PAGE 274

Length of male 10.5 mm. Head with median length of crown almost six-tenths interocular width and almost four-tenths transocular width, anterior margin without a carina at transition from crown to face, with a transverse concavity before ocelli; antennal ledges carinate dorsally; face with muscle impressions distinct. Pronotum with hind margin rectilinear; forewing with membrane including only commissural portion of inner apical cell and apical portion of second apical cell, translucent, veins distinct, without an anteapical plexus of veins; first hind tarsomere with length approximately equal to combined length of second and third tarsomeres. Male with pygofer well produced, strongly convex at apex, with a group of macrosetae beginning posterodorsally at apex and extending anteroventrally to middle of posteroventral margin, these close-set and shorter near posterodorsal margin, sparser and longer near posteroventral margin, with few microsetae on posterior half of disk and a larger number on ventral half of disk, pygofer without processes; style foot-shaped at apex; connective semi-oval with a median elongate very strong carina which extends anteriorly beyond its base; aedeagus without processes, extending posteriorly, curved abruptly dorsally before midlength, rounded apically. Female unknown. Other structural characters as in *P. lugubris*, n. sp.

Ground color of crown orange, of pronotum, scutellum, and forewings pale yellow, with a pair of parallel median longitudinal stripes, a diagonal stripe each side of these, and lateral margins of pronotum, darker yellow; scutellum with some darker yellow markings (obscured by pin); forewing with outer claval vein darker yellow, commissural margin throughout length of clavus, and costal margin, narrowly black; venter sordid yellow, face with a median dull red stripe extending over clypeus and base of clypellus, all tarsi and apical portions of middle and hind femora, black.

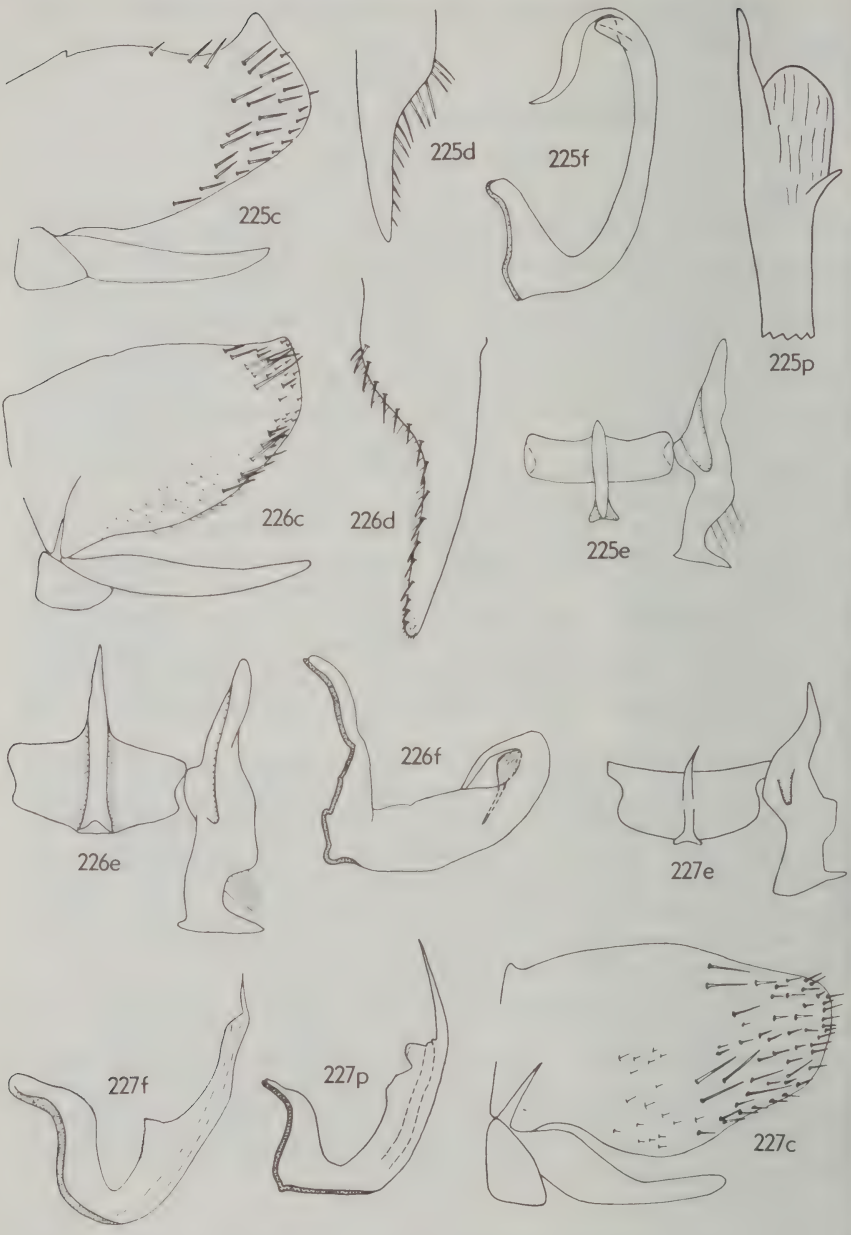
Described from a single specimen from east of Olmos, Lambayeque, Peru, 2,000 m., January 19, 1955 (E. I Schlinger and E. S. Ross) (CAS).

P. stewartae, n. sp., differs from all other species of *Paromenia* in its complete lack of processes on the aedeagus. The form of the head is very close to a sketch of the head of the holotype of *Tettigonia longipes* Walker made in BM by the author. The species is named in honor of Mrs. Judith Stewart, who made many of the illustrations for this revision.

Paromenia maculosa, NEW SPECIES

FIGURE 219, PAGE 274

Length of male 12.2-12.5 mm, of female 12.7-13.5 mm. Head with median length of crown from slightly more than half to six-tenths interocular width



FIGURES 225-227.—225, *Paromenia rufa* (Walker) (*c-f*, from specimen from Colombia; *p* from Ecuador): *p*, Aedeagal apex from caudal view. 226, *P. intacta* (Walker) (from specimen from Ocana, Colombia). 227, *P. clarkei*, n. sp. (from specimens from Colombia): *p*, Aedeagus from lateral view.

and slightly more than one-third transocular width, with a slight transverse concavity before ocelli, lateral clypeal sutures usually attaining ocelli. Pronotum with hind margin varying from slightly convex to slightly concave; forewing without a membrane, opaque, the veins darkened or not, without an anteapical plexus of veins; first hind tarsomere with length slightly greater than combined length of second and third tarsomeres. Male with pygofer moderately produced, posterodorsal margin narrowly rounded, macrosetae irregularly arranged in an oblique band on apical third of disk, pygofer with processes which are concealed by surface of pygofer in lateral aspect; plates slender and triangular, not extending as far posteriorly as pygofer apex, with macrosetae serially arranged; style moderately expanded at apex; connective cordate, with a strong median carina; aedeagus broadest in basal half, narrowed before apex which is trilobed with none of the lobes differentially sclerotized. Female abdominal sternum VII with posterior margin convex with a very slight median emargination. Other structural characters as in *P. lugubris*, n. sp.

Color of dorsum varying from amber to pale yellow, with posterior two-thirds of scutellum paler, entirely maculate with dark red in amber specimens, with darker yellow in yellow specimens; color of venter and legs varying from yellowish-orange through yellow to dark brown.

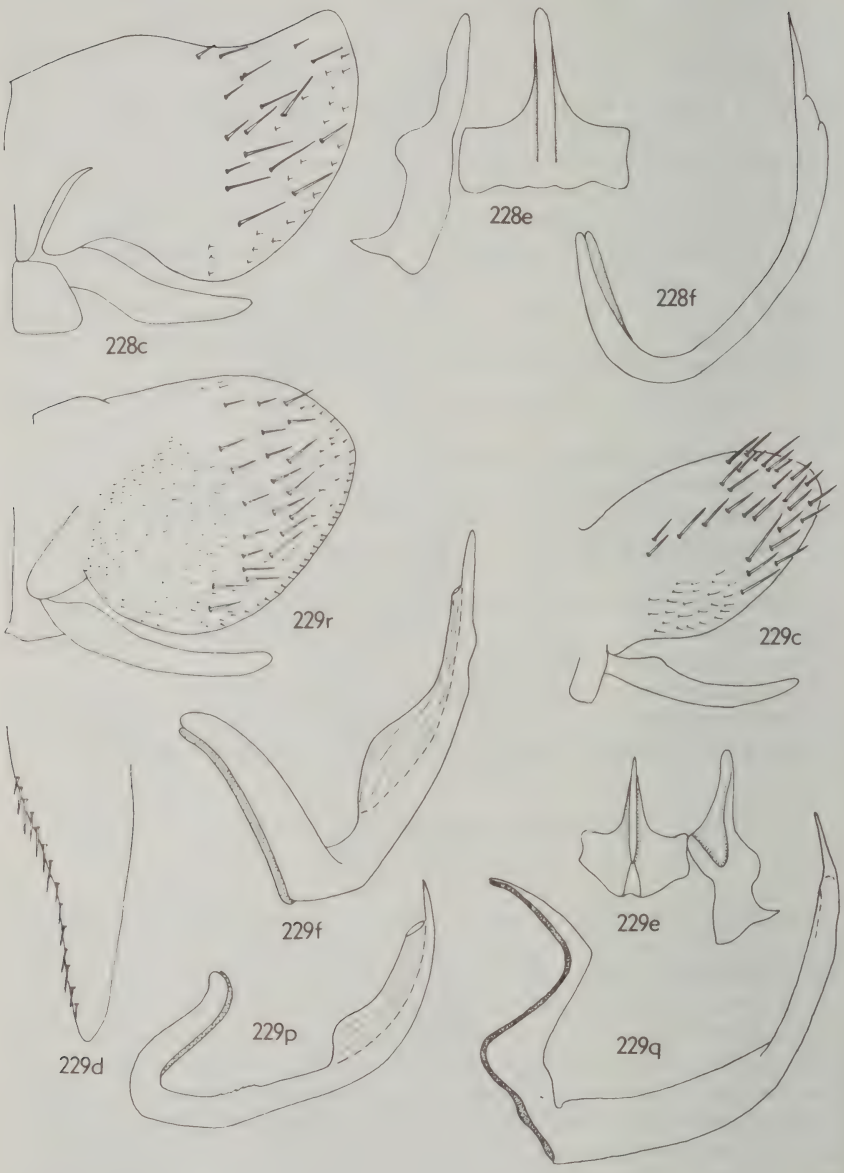
Holotype male, Balzapamba, Ecuador, May 22, 1938, 700 meters (W. Clark-Macintyre) and seven additional specimens from same locality (NCS). Additional specimens have been examined from Playas and from Chimbo, Ecuador. Holotype on indefinite loan to USNM.

P. maculosa, n. sp., is closely related to *P. isabellina* (Fowler) from which it may be distinguished by the shorter pygofer process which in lateral view is concealed by the pygofer, and by the trilobate apex of the aedeagus.

Paromenia zapala, NEW SPECIES

FIGURE 217, PAGE 270

Length of male 13.3-13.5 mm, of female 13.0 mm. Head with median length of crown more than half interocular width and slightly more than one-third transocular width, with a transverse concavity before ocelli, lateral clypeal sutures attaining ocelli or not; face with muscle impressions distinct. Pronotum with hind margin rectilinear or slightly concave; forewing membrane including only apical portions of apical cells, texture translucent; first hind tarsomere with length slightly greater than combined length of second and third tarsomeres. Male with pygofer moderately produced, with posterior margin narrowly rounded, macrosetae fairly numerous, irregularly distributed on apical half, with a process arising along dorsal margin, free at its apex, with a short spinelike anteapical branch, apex acute; plates triangular, abruptly narrowed before midlength, not extending as far posteriorly as pygofer apex, with macrosetae serially arranged; style very short, very broad at apex, apical margin with a slight concavity; connective almost a transverse bar, with a strong median carina; aedeagus in lateral view with anterior margin strongly convex, posterior margin concave, with a slender, median,



FIGURES 228, 229.—228, *Paromenia rimacensis*, n. sp. (from specimen from Lima, Peru). 229, *P. auroguttata* (Signoret) (*c*, *d*, *f*, from specimen from Tingo María, Peru; *e*, *p*, from Rancho Grande, Venezuela; remainder from Baños, Ecuador): *p*, *q*, Aedeagus from lateral view; *r*, male pygofer from lateral view (*c* and *f* are typical).

elongate, almost straight process which is rounded at apex. Female abdominal sternum VII with posterior margin slightly convex, with a shallow median excision. Other structural characters as in *P. lugubris*, n. sp.

Color of dorsum sordid tan to bright yellow with veins of forewings darkened or not, with or without orange or deep yellow spots; venter and legs concolorous with dorsum.

Holotype male, a series of additional males and one female, Coroico, Bolivia (OSU).

P. zapala, n. sp., is closely related to *P. isabellina* (Fowler) but can be separated readily from the latter by the form of the apex of the aedeagus and the short dorsal spine at the base of the free portion of the pygofer process.

Paromenia falcata, NEW SPECIES

FIGURE 216, PAGE 270

Length of male 13.7-14.1 mm. Head with median length of crown about six-tenths interocular width and approximately four-tenths transocular width, with a transverse concavity before ocelli, lateral clypeal sutures attaining ocelli or not; antennal ledges with anterior margins rectilinear in lateral view; face with clypeus slightly flattened medially, muscle impressions distinct. Pronotum with hind margin concave; forewing with membrane including apical portion of inner three apical cells, texture translucent to opaque, at least some of veins of corium darkened, with an anteapical plexus of veins; first hind tarsomere with length slightly greater than combined length of second and third tarsomeres. Male pygofer with posterodorsal portion produced in an undifferentially sclerotized acute process, the posterior margin concave beneath it, macrosetae irregularly arranged, a few at base of posterodorsal process, and a number on posteroventral portion of disk; plates slender, triangular, extending posteriorly almost as far as pygofer apex, macrosetae serially arranged; style gradually expanded apically, the apical margin convex; connective broadly U-shaped with a strong median carina; aedeagus with shaft broadest near midlength, the apex concave in lateral view and with a short angular projection on anterior margin. Female unknown. Other structural characters as in *P. lugubris*, n. sp.

Color of dorsum amber with coronal muscle impressions, anterior portion of pronotum, basal angles of scutellum, at least some of veins in corium and occasionally the claval veins, a transcommissural area posterior to claval apex, smoky; face and venter usually slightly darker than dorsum, with apical portions of middle and hind femora and all tarsi, dark gray to black.

Holotype male, Santo Domingo, Ecuador, March 19, 1950 (S. W. Frost); four specimens, Santo Domingo, Ecuador, November 6, 1953 (H. Yust); and three specimens, Santo Domingo de los Colorados, Pichincha, Ecuador, 2,000 ft., February 6, 1958 (R. W. Hodges) (USNM). A series of additional specimens, some with abdomen missing, from near the type locality and two specimens, one mile south of Pisco, Peru (CAS).

P. falcata, n. sp., is similar to *P. isabellina* (Fowler) and *P. maculosa*, n. sp., in the form of the shaft of the aedeagus in lateral view, but differs from both of

these in the apex of the aedeagus and in the form of the pygofer process, as well as in the apex of the style which is different from all other species of *Paromenia*.

Paromenia propria, NEW SPECIES

FIGURE 213, PAGE 268

Length of male 10.1-10.5 mm. Head with median length of crown from slightly greater than one-half to six-tenths interocular width and approximately four-tenths transocular width, with or without a transverse concavity before ocelli, lateral clypeal sutures not attaining ocelli; face with muscle impressions distinct. Forewing with veins darkened or not; first hind tarsomere with length equal to or greater than combined length of second and third tarsomeres. Male with pygofer moderately produced, with a small quadrate apical projection, macrosetae irregularly arranged in a group parallel to posteroventral margin, with a number of microsetae on ventral half of disk; plates triangular, extending about as far posteriorly as pygofer apex, with multiseriate macrosetae; style not broadly expanded in apical portion, truncate apically; connective somewhat T-shaped, with a median carina on basal half; aedeagus with pair of broad lateral lobes in basal half, apex rounded and without processes. Female unknown. Other structural characters as in *P. lugubris*, n. sp.

Color sordid yellow to dull gray, with a pink spot in apex of second apical cell of forewing and occasionally with a similar adjacent spot in apex of inner apical cell.

Holotype male, La Forestière, Upper Maroni River, French Guiana, July (Le Moult), an additional male specimen from French Guiana (NCS). One male from Essequebo River, British Guiana (BM). Holotype on indefinite loan to USNM.

P. propria, n. sp., is closely related to *P. rossi*, n. sp., from which it differs in its narrower pygofer process, its lack of apical aedeagal processes and its broader lateral aedeagal lobes.

Paromenia rossi, NEW SPECIES

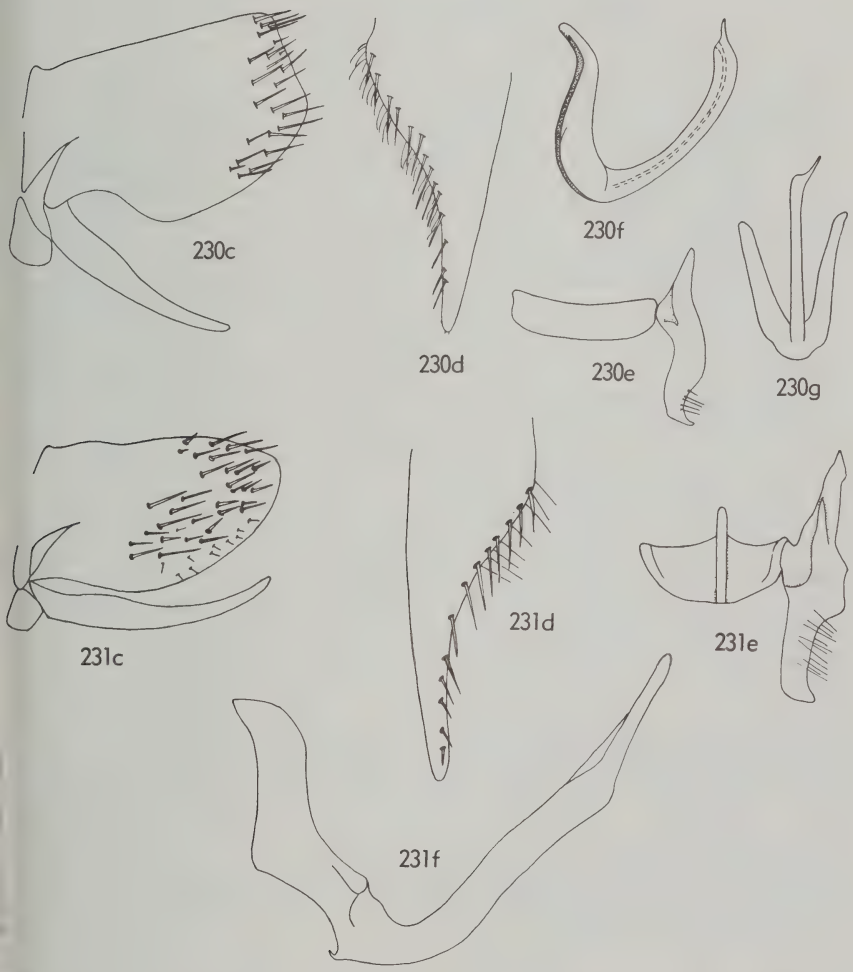
FIGURE 214, PAGE 268

Length of male 12.1-12.7 mm, of female 12.3 mm. Head with median length of crown one-half interocular width and one-third transocular width, with transverse concavity before ocelli; face with muscle impressions distinct. Forewing with membrane including apical portions of all apical cells, the veins darkened or not; first hind tarsomere with length slightly greater than combined length of second and third tarsomeres. Male pygofer with a broad quadrate apical undifferentially sclerotized process extending dorsally, macrosetae in an apical group; plates triangular, extending approximately as far posteriorly as pygofer apex, with macrosetae multiseriate; style slightly expanded at apex, with apical margin concave; connective a transverse bar with

a strong median carina; aedeagus with shaft slender, bisinuate in lateral view, with a pair of slender digitate lateral processes at midlength, and a slender acute apical process which is not median. Other structural characters as in *P. lugubris*, n. sp.

Color dull brown to golden yellow, an area before ocellus, anterior portion of pronotum, and scutellum darker, the scutellum occasionally black at base; forewings with apical margins narrowly bordered with smoky; venter and legs often concolorous with dorsum, occasionally with legs somewhat darker.

Holotype male, Monsón Valley, Tingo María, Peru, December 2, 1954 (E. Schlinger and E. S. Ross) and seven additional male and one female



FIGURES 230, 231.—230, *Paromenia lugubris*, n. sp., holotype. 231, *P. weyrauchi*, n. sp., holotype.

topotypes, collected October to December (CAS). One male, same locality, collected in August. One male, Purús River, Brazil (OSU).

P. rossi, n. sp., is closely related to *P. propria*, n. sp., from which it differs markedly in its broader pygofer process which is directed dorsally instead of posteriorly as in *propria*, in its narrower lateral processes of the aedeagal shaft, and in the presence of the narrow acute apical process.

This species is named in honor of E. S. Ross of the California Academy of Sciences whose many collections in the tropics have aided materially in the present study.

Paromenia rimacensis, NEW SPECIES

FIGURE 228, PAGE 280

Length of male 11.2-12.3 mm, of female 12.0-13.3 mm. Head with median length of crown varying from slightly less than six-tenths to slightly more than six-tenths interocular width and from one-third to four-tenths transocular width, with a distinct transverse concavity before ocelli. Pronotum with posterior margin varying from slightly convex to slightly concave; forewing without a membrane, translucent, the veins not darkened, with an anteapical plexus of veins; first posterior tarsomere with length approximately equal to combined length of two more distal tarsomeres. Male pygofer moderately produced, subangulate posterodorsally, posteroventral margin broadly convex, macrosetae not numerous, located on posterior half of disk, with numerous microsetae, pygofer without processes, plates triangular with apices rounded, not extending nearly as far posteriorly as pygofer apex. Female abdominal sternum VII produced, posterior margin convex on each side of a shallow median notch. Color entirely dull yellow.

Holotype and two additional males and two females, Lima, Peru, September 29 (Wille); two males, Lima, Peru, June, 1928 (G. N. Wolcott); one female, Peru (P. R. Uhler collection); one male and one female, Lima, Peru (Lot 2-11 '30); three males and three females, La Molina, Peru, December 1, 1960 (Molleda), on *Pennisetum purpureum* Schumann; two males and one female, Lima, Peru, June 27, 1965 (Woytkowski), in light trap; one male, Olmos, Peru (D. Ojeda) and one female same data except collector ("Korytkowski"); two females, Cañete, Peru, January 4, 1942 and one female same locality, December 14, 1941 (all E. J. Hambleton) (USNM). Two males and one female, Bella Vista, near Callao, Peru (MMB). Two females, Peru, March, 1903 (BM). Three males and six females, Chaclacayo, Peru, 750 meters (AMNH).

The male genitalia of *P. rimacensis*, n. sp., are similar to *P. auroguttata* (Signoret), but the specimens are more robust and the plexus of the forewings differs from *auroguttata*.

40. Genus ONEGA Distant

Figures 232-236

Onega Distant, 1908a:528. Type-species: *Onega avella* Distant, by original designation.

Length 13.3-16.8 mm.

Head moderately produced, its median length varying from slightly more than one-half of to slightly greater than interocular width and from approximately one-third to slightly more than four-tenths transocular width, anterior margin with a carina at transition from crown to median portion of clypeus, ocelli located on a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, surface of crown distinctly concave behind apex (markedly concave in *Onega avella* Distant and *O. fassli*, n. sp.), and concave laterad of each ocellus, the concave portions confluent or not (*O. stipata* (Walker)), lateral clypeal sutures extending onto crown but not attaining ocelli; antennal ledges with anterior margins short and usually strongly convex in lateral view; face with clypeus flattened to strongly concave, muscle impressions distinct (exception: *O. bracteata*, n. sp.), transclypeal suture obsolete, with weak pubescence on clypellus.

Pronotum wider than head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave (exception: some specimens of *bracteata*), disk without pubescence, usually without distinct sculpturing (irregularly, weakly punctate in *avella*); scutellum with posterior portion swollen, without sculpturing. Forewing with or without a membrane, veins usually not elevated (exception: clavus of *avella*), distinct or not, with four apical cells of which base of fourth is more proximal than base of third, with or without an anteapical plexus of veins (varying interspecifically), texture translucent to coriaceous, wings of female at rest exceeding apex of ovipositor. Hindleg as in genus *Paromenia* Melichar.

Male genitalia: Male pygofer moderately to strongly produced, with setae of uniform or mixed sizes, the chaetotaxy specific, pygofer processes present or absent. Plates variable interspecifically, not fused basally, with uniseriate macrosetae. Style extending posteriorly to or beyond apex of connective, apex variable interspecifically. Connective variable between species, strongly carinate. Aedeagus with shaft elongate, curved dorsally or not, narrowed apically or with paired apical processes. Paraphyses usually absent (present as a median sclerite in *fassli*).

Female (unknown in *stella* Distant and *bracteata*) abdominal sternum VII and ovipositor second valvulae as in *Paromenia* Melichar. Pygofer not strongly produced, apex strongly convex, macrosetae greatly variable in number and located before apex and near posteroventral margin.

Specimens of *Onega* have been examined from Colombia to Bolivia. *Onega* is closely related to the genus *Paromenia* Melichar from which it may be separated readily by the carina at the transition from crown to clypeus, and the concavity on the crown behind the apex in *Onega*. The facies of species of *Onega*, except for *bracteata*, differ from *Paromenia*.

It seems probable that genus *Aglaenita* Spinola, 1850a:59 (type-species: *A. bipunctata* Spinola) from French Guiana is congeneric, judging from photographs of a specimen from the Spinola collection in the Tassarola Castle, near Torino, Italy. The photographs were sent to Dr. Paul Freytag by Dr. Carlo Vidano, and forwarded to me. I have not synonymized the two generic names here because the evidence is not sufficient, but the facies of the Spinola specimen and the concavity of the profile of the face below the apex of the head are suggestive that the specimen is an *Onega* as interpreted here.

My interpretations of *Onega avella* Distant, *O. stella* Distant, and *Tettigonia stipata* Walker are based on examination of the male lectotypes of each of these nominal species.

SPECIES OF *ONEGA*

avella Distant, 1908a:528. Ecuador.
bracteata, n. sp. Colombia, Ecuador, Peru, Bolivia.
fassli, n. sp. Colombia.
stella Distant, 1908a:529. Ecuador.
stipata (Walker), 1851b:749 (*Tettigonia*). Ecuador. New combination.

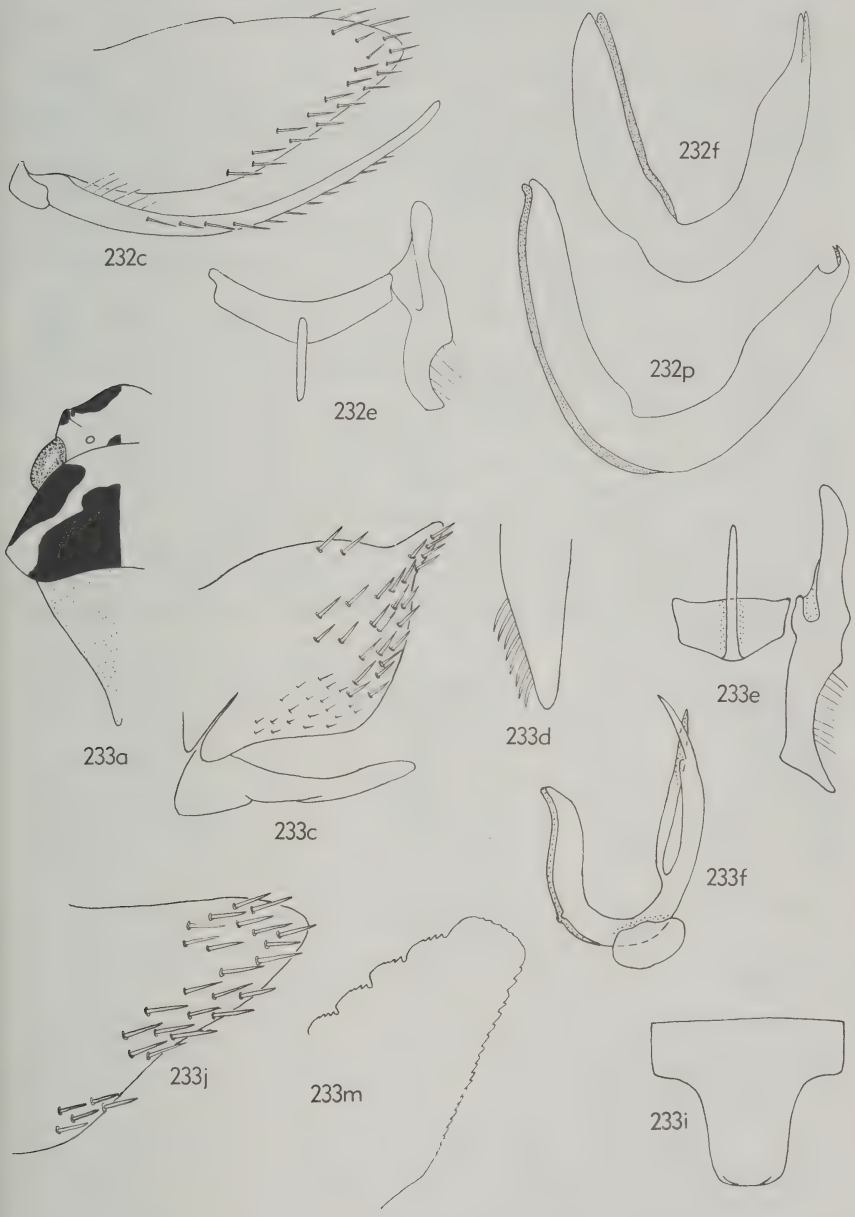
KEY TO MALES OF *ONEGA*

1. Forewings yellowish translucent, without supernumerary crossveins ..... *bracteata*, n. sp.
   Forewings opaque, with supernumerary crossveins in clavus, or corium, or both 2
2. Aedeagus with a process arising dorsally in basal half, extending as far as apex of shaft ..... *fassli*, n. sp., page 289
   Aedeagus without such a process 3
3. Styles broadened and foot-shaped at apex, male pygofer terminating dorsoapically in an acute process 4
   Styles broadened but not foot-shaped at apex (fig. 234*e*); male pygofer without processes, rounded apically ..... *stipata* (Walker) (fig. 234)
4. Forewings with claval reticulations limited laterally and posteriorly by outer claval vein ..... *avella* (Distant) (fig. 235)
   Forewings with claval reticulations more extensive ..... *stella* Distant (fig. 236)

Onega bracteata, NEW SPECIES

FIGURE 232

Length of male 13.3-15.2 mm. Head with median length of crown slightly greater than interocular width and approximately one-third transocular width, with an arcuate concavity behind and parallel to anterior margin; antennal ledges with anterior margins almost vertical in lateral view; clypeus slightly concave medially, muscle impressions usually not distinct. Pronotum with posterior margin varying from slightly convex to slightly concave. Forewing



FIGURES 232, 233.—232, *Onega bracteata*, n. sp. (*p* from specimen from Huánuco, Peru; remainder from holotype): *p*, Aedeagus from lateral view. 233, *O. fassli*, n. sp. (specimens from Quindiu Pass, Colombia; *c-f*, from holotype; aedeagus and paraphysis shown in *f*).

with only a narrow portion of inner apical cell, bordering appendix, membranous, veins not very distinct, without an anteapical plexus of veins. Hindleg with first tarsomere greater in length than combined second and third tarsomeres. Male with pygofer very strongly produced posteriorly, posterior margin narrowly rounded, macrosetae rather sparse and occurring on and near posterodorsal, posterior, and ventral margins, pygofer without processes; plates very elongate and slender, extending posteriorly beyond pygofer apex; style truncate apically, not expanded at apex; connective broadly V-shaped; aedeagus in lateral aspect with shaft broadest anteapically, with a pair of short apical processes which may be straight or cultrate. Female unknown. Other structural characters as in generic description.

Color of dorsum golden yellow, apices of forewings occasionally with a narrow smoky marginal band; face and venter concolorous with dorsum.

Holotype male, Callanga, Paucartambo Prov., Cuzco, Peru, February 19, 1952 (F. L. Woytkowski) and six additional specimens, same data; one male, Mapiri, Bolivia and three males, Huallaga River Valley, Peru (NCS). One male, Valle de Cauca, Colombia (UCAL). One male, Tarma, Peru and a male from Tingo María, Peru (AMNH). One male, Macai, Ecuador and another, Muzo, Colombia (OSU). One male, Callanga, Peru (ZIL). Two specimens, Callanga, Peru (USNM). Holotype on indefinite loan to USNM.

In general appearance, *O. bracteata*, n. sp., resembles species of *Paromenia*, but it can be separated quickly by the carinate head and the concavity on the crown behind the apex.

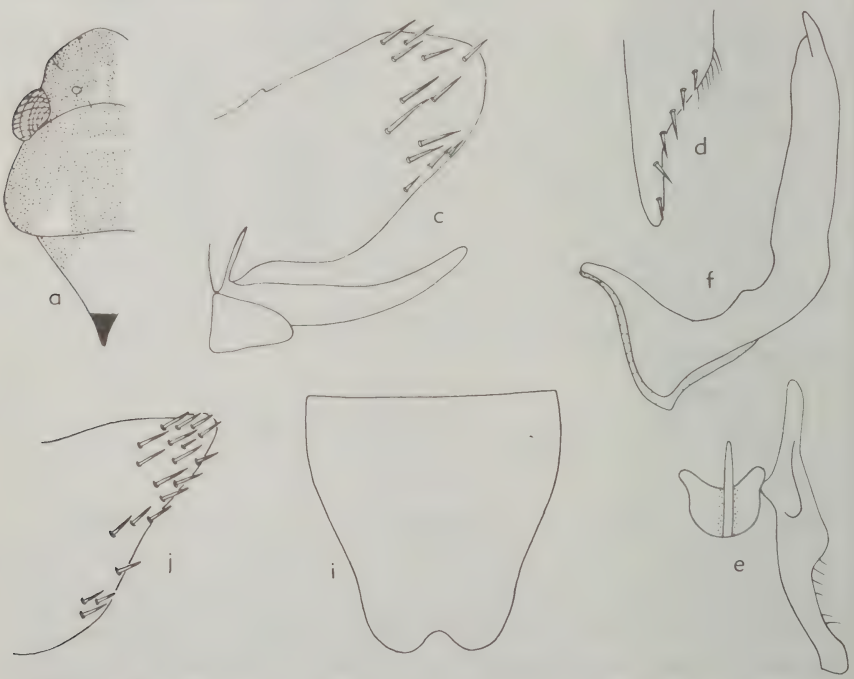


FIGURE 234.—*Onega stipata* (Walker) (from specimens from Ecuador).

Onega fassli, NEW SPECIES

FIGURE 233

Length of male 16.4-16.8 mm, of female 16.3 mm. Head with median length of crown slightly more than one-half interocular width and approximately one-third transocular width, with entire surface of disk of crown deeply concave; antennal ledges with anterior margins convex in lateral view;

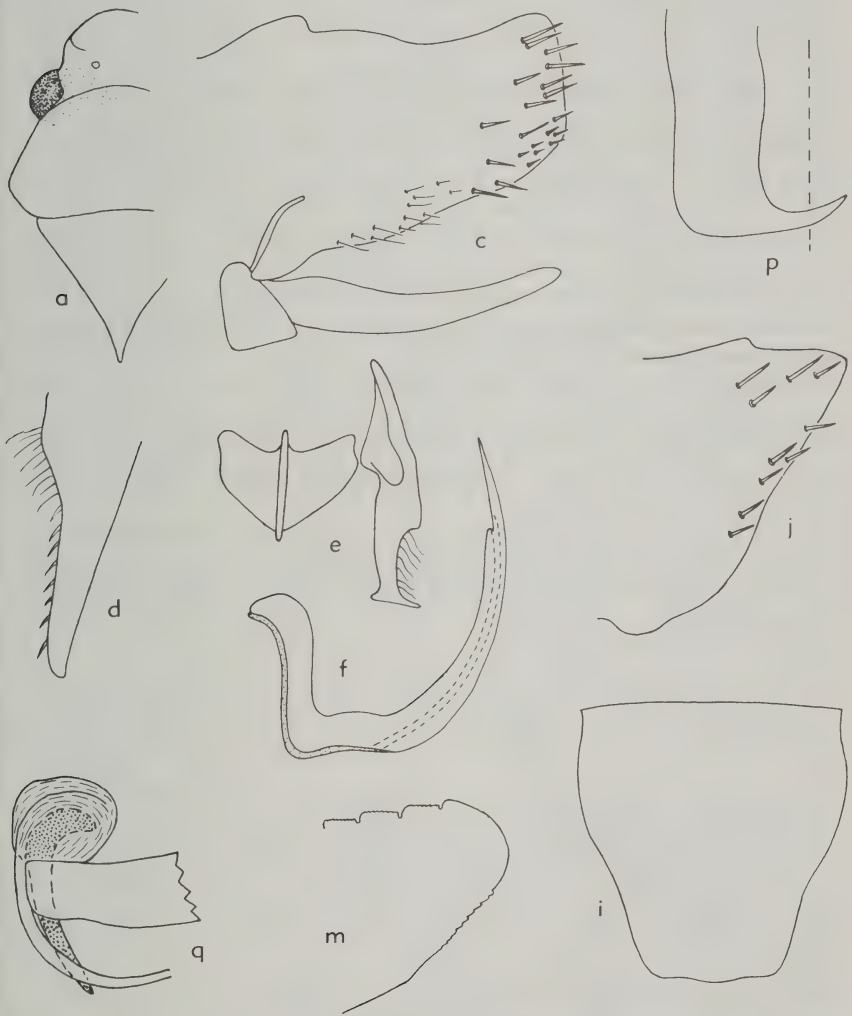


FIGURE 235.—*Onega avella* Distant (from specimens from Ecuador): *p*, Male pygofer apex, left side, from caudoventral view; *q*, left first valvifer, dorsal ramus of valvula I and median sclerite (shaded) of genital chamber, from lateral view.

clypeus strongly concave below apical carina, the concavity less pronounced over disk of clypeus, muscle impressions distinct. Pronotum with posterior margin slightly concave. Forewing with inner apical cell completely, and narrow apical portion of second and third apical cells membranous, veins not distinct, with a network of veins on both clavus and corium, but not involving brachial cell and outer claval cell. Hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Male with pygofer not as strongly produced as in *O. bracteata*, n. sp., with a narrow apical lobe extending posterodorsally, macrosetae as in *bracteata*, but occurring also near middle of disk, with a group of microsetae near ventral margin, pygofer without processes; plates not extending as far posteriorly as pygofer apex; style broadened and obliquely truncate apically; connective a transverse bar; aedeagus in lateral aspect with basal portion of shaft tapering, abruptly narrowed apically, with a dorsal process arising near base, extending apically almost as far as apex of shaft; with an unpaired median paraphysis occurring beneath base of shaft. Other male structures as in generic description.

Female abdominal sternum VII abruptly narrowed near base, extending posteriorly as a broad truncate lobe; pygofer with macrosetae numerous on apical half and in a broad area parallel to posteroventral margin.

Color tan, anterior and posterior margins of crown, a few variable markings on pronotum, a median incomplete line on scutellum in some specimens, base of forewing, the costal margin (often faintly) and an oblique anteapical area extending from costal margin into apical cells, dark red; face except genae, pleura, and most of venter and legs, brighter red, a median line at apex of clypellus (occasionally), genae (occasionally), some setae on posterior tibiae, and portions of all tarsi, black.

Holotype and two additional males, Paso del Quindiu, Central Cordillera, Colombia, 3500 m. (Fassl) and twenty-seven additional specimens labeled "Quindiupass, Colombia" (OSU). One teneral male, Bogotá [Colombia] (Lindig) (RMS).

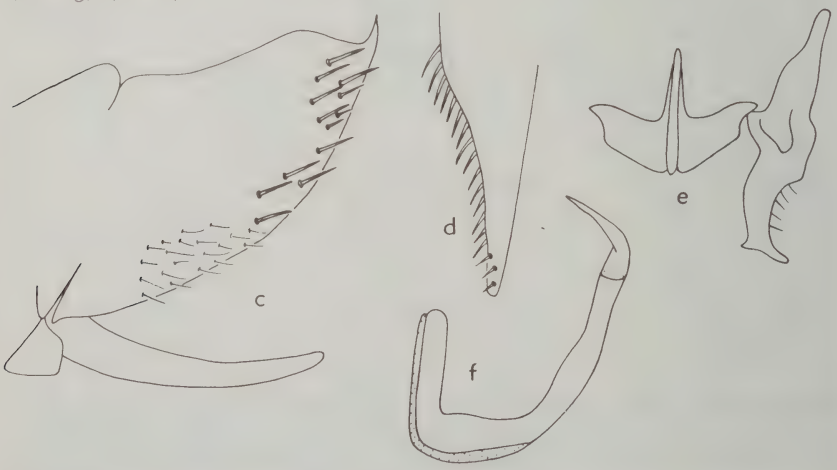


FIGURE 236.—*Onega stella* Distant (from specimen from Baiza, Ecuador).

Onega fassli differs from all other species of the genus in the somewhat constricted appearance of the male pygofer at its apex, the presence of a paraphysis in the male, and in the basal aedeagal process.

41. Genus **DASMEUSA** Melichar

Figures 237-240

Dasmeusa Melichar, 1926a:342. Type-species: *Cicada pauperata* Fabricius, by subsequent designation of Evans, 1947a:159.

Length 9.9-11.1 mm.

Head well produced, median length of crown varying from slightly more than eight-tenths to more than nine-tenths interocular width and from one-half to almost six-tenths transocular width, anterior margin parabolic, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each ocellus slightly closer to anterior eye angle than to median line of crown, surface of crown slightly concave, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges with anterior margins oblique and convex in lateral view; face with clypeus strongly convex, muscle impressions distinct, transclypeal suture obsolete. Pronotum with width approximately equal to transocular width of head, posterior margin slightly convex or rectilinear, otherwise as in *Paromenia* Melichar. Forewing with membrane absent or including only inner portion of inner apical cell and narrow apical portions of other apical cells when distinct, anteapical plexus of veins never present, other wing characters as in *Paromenia*. Hindleg with first tarsomere longer than combined length of more distal tarsomeres, otherwise as in *Paromenia*.

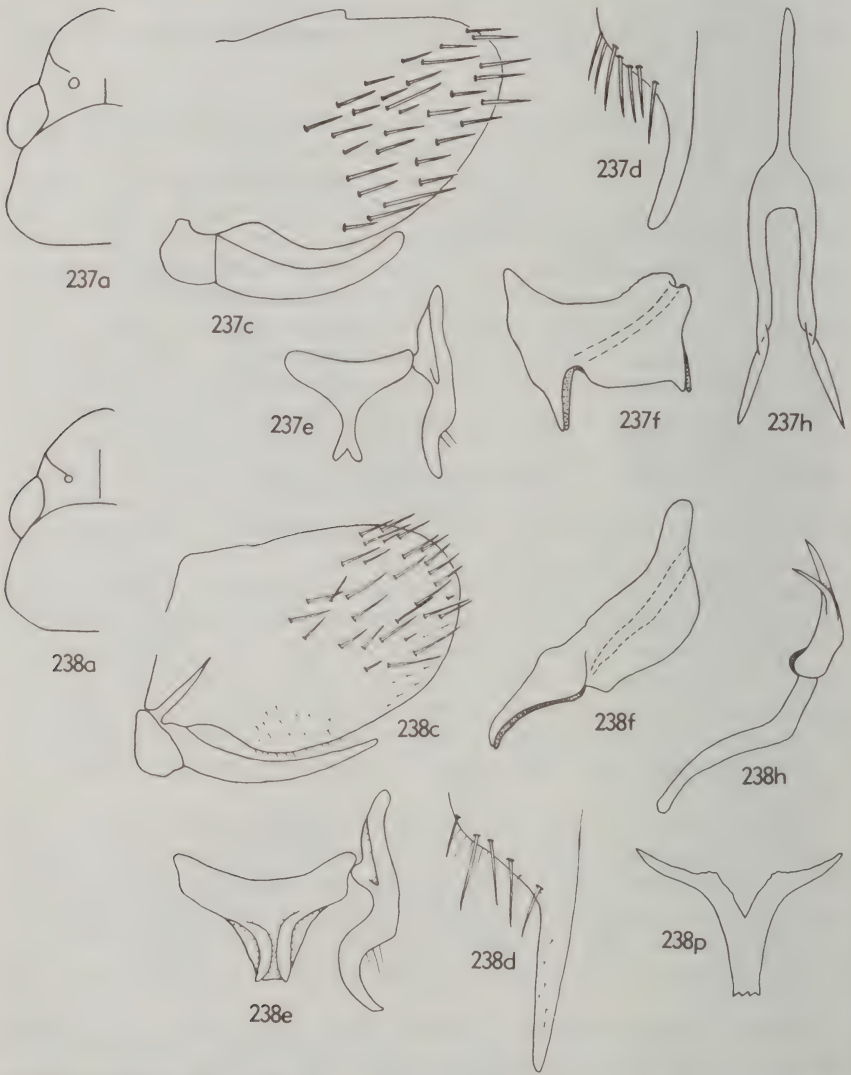
Male genitalia: Pygofer moderately produced, macrosetae numerous and occurring on posterior half, without processes. Plates triangular, separate throughout their length, each narrowed at midlength, with uniseriate macrosetae in basal half, not extending posteriorly as far as pygofer apex. Style extending posteriorly as far as or farther than apex of connective, without a preapical lobe, rounded apically; connective broadly T-shaped, not carinate medially; aedeagus with shaft short, with or without processes. Paraphyses long-stalked.

Female abdominal sternum VII well produced with posterior margin subparabolic. Ovipositor with most of dorsal margin of second valvula bearing convex close-set teeth; apex bluntly rounded dorsally, posteroventral apical margin slightly concave and denticulate. Pygofer as in *Paromenia* Melichar.

Specimens of *Dasmeusa* are pale yellow, often with tinges or spots of orange at base and near apex of the forewings. The genus occurs in the Guianas and Brazil.

Dasmeusa Melichar is similar in many respects to *Paromenia*, but the species are more slender, and with the head more produced. The paired paraphyses in the male genitalia will readily separate specimens of *Dasmeusa* from *Paromenia*.

My interpretation of *Dasmeusa flavescens* Metcalf is based on an examination of the lectotype of Signoret's *Tettigonia lurida* which resulted only in verifying the generic disposition of the species, which is possibly synonymous with *Cicada pauperata* Fabricius, of which the genitalia of the male lectotype were compared with the genitalia illustrations published here (fig. 238).



FIGURES 237, 238.—237, *Dasmeusa mendica*, n. sp., holotype. 238, *D. pauperata* (F.) (from specimens from British Guiana; *h* from lateral view); *p*, Apices of paraphyses from ventral view.

SPECIES OF *DASMEUSA*

flavescens Metcalf, 1965a:261 (new name). Brazil.
lurida (Signoret), 1853c:662 (*Tettigonia*) (preoccupied).
mendica, n. sp. French Guiana.
pauperata (Fabricius), 1803a:71 (*Cicada*). The Guianas.

KEY TO SPECIES OF *DASMEUSA*

(*D. flavescens* Metcalf not included)

Forewings with distinct orange anteapical spot; male with a pair of anteapical ventral processes on aedeagus ..... *mendica*, n. sp.
Forewings without anteapical spot; male without anteapical processes on aedeagus ..... *pauperata* (Fabricius) (fig. 238)

Dasmeusa mendica, NEW SPECIES

FIGURE 237

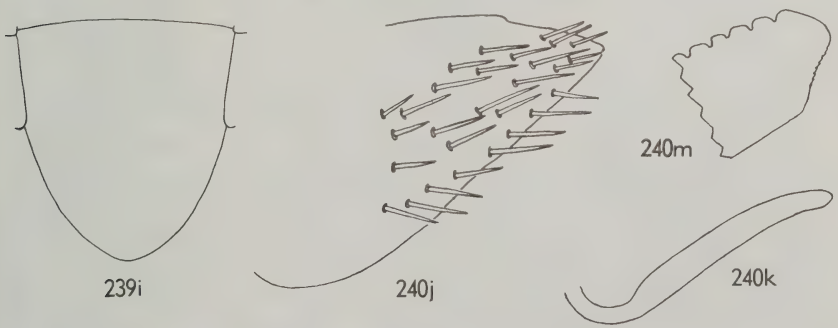
Length of male 10.1-10.4 mm, of female 9.9-10.5 mm. Head with median length of crown compared to width varying as in generic description. Male pygofer with only a few microsetae dispersed among macrosetae. Aedeagus short, with a pair of widely spaced laterobasal processes, triangular in lateral view, extending laterally and ventrally, and a pair of close-set anteapical ventral angular processes, gonopore dorsoapical. Paraphyses with rami longer than stalk, divergent apically, but much less so than in *D. pauperata* (F.).

Color pale yellowish, forewings translucent with a transverse distinct orange spot across bases of apical cells.

Other characters as in generic description.

Holotype and one additional male and one female, Maroni River, French Guiana (NCS). One female, Essequebo River, Moraballi Creek, August 24, 1929, Oxford University Expedition (BM). One male, St. Jean du Maroni, French Guiana, from the Le Moult collection (ZIMH).

Dasmeusa mendica, n. sp., is more slender and delicate than *D. pauperata* from which it differs in the length of the base of the paraphyses relative to the rami (shorter than rami in *mendica*) as well as in the characters in the key.



FIGURES 239, 240.—239, *Dasmeusa flavescens* Metcalf (from lectotype of *D. lurida* (Signoret)). 240, *Dasmeusa* sp. (from specimen from Bartica, British Guiana).

42. JOZIMA, NEW GENUS

FIGURE 241

Type-species: The species I have identified and illustrated here as *Tettigonia leucopa* Walker (1858b:217).

Length of male 9.6-10.1 mm, of female 10.7 mm.

Head moderately produced, median length of crown varying from slightly more than one-half to slightly more than six-tenths interocular width and from slightly more than one-third to slightly more than four-tenths transocular width, ocelli located on a line between anterior eye angles, each ocellus approximately equidistant from adjacent anterior eye angle and median line of crown; antennal ledges not carinate; apical margin of clypellus shallowly concave medially, other head characters as in *Dasmeusa* Melichar.

Pronotum with posterior margin shallowly concave, otherwise as in *Paromenia* Melichar. Forewing with membrane including all of inner apical cell, apical halves of second and third apical cells and only apical portion of

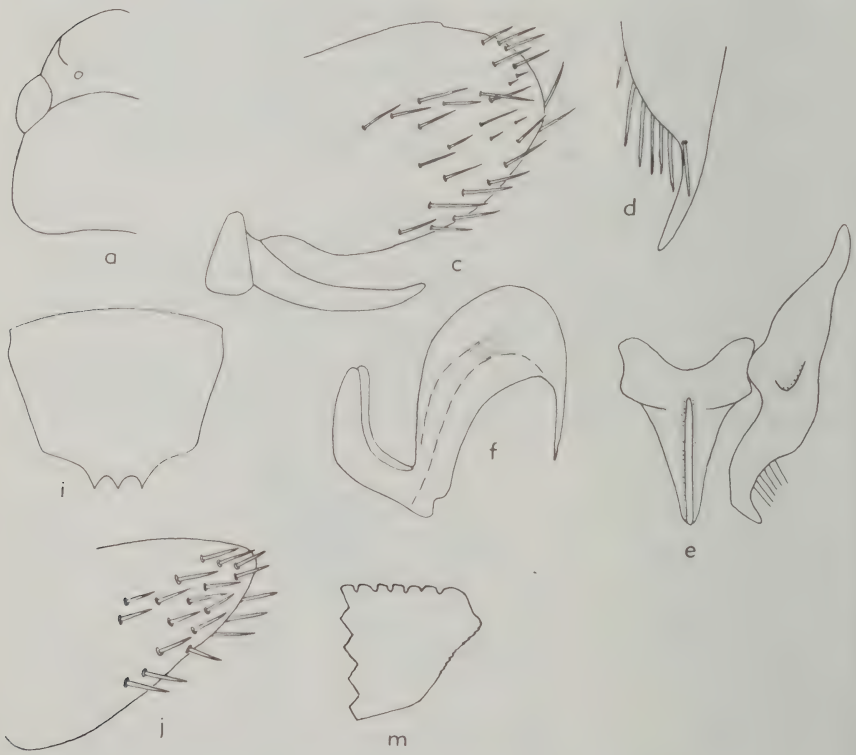


FIGURE 241.—*Jozima leucopa* (Walker) (*i* from specimen from Río Napo, Peru; remainder from specimens from Cuzco, Peru).

outer apical cell, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture subhyaline; wings of female in rest position exceeding apex of ovipositor. Hindleg with length of basal tarsomere greater than combined length of more distal tarsomeres, otherwise as in *Paromenia*.

Male genitalia: Pygofer moderately produced, macrosetae irregularly distributed on apical half, without processes. Plates triangular, very short, narrowed at midlength, not extending nearly as far posteriorly as pygofer apex, each with a few uniseriate macrosetae in basal half. Style extending approximately as far posteriorly as connective, obliquely truncate at apex. Connective Y-shaped, carinate. Aedeagus with shaft short, strongly convex in lateral view, apex decurved in an acute process. Paraphyses absent.

Female abdominal sternum VII produced and with a pair of concavities at apex. Ovipositor with most of dorsal margin of second valvula bearing convex, close-set teeth; apex blunt, with posterodorsal and posteroventral margins slightly concave, the latter denticulate. Pygofer as in *Paromenia*.

Jozima, new genus, is related to *Paromenia* Melichar, and *Dasmeusa* Melichar. The form of the aedeagus and the Y-shaped connective of *Jozima* will readily separate males from *Paromenia*. *Dasmeusa* specimens are more delicate and slender and have paraphyses in the male genitalia. The form of the apex of the clypellus in *Jozima* is similar to that found in *Baleja* Melichar. Specimens of *Jozima* are similar in appearance to *Dasmeusa* and many species of *Paromenia*, dull yellow, with the crown and face suffused with orange in some specimens.

Walker described *Tettigonia leucopa* from Peru. I have seen a specimen in the British Museum from the Napo River area. The head had been glued on and did not fit the original description at all. The abdomen (female) had been removed and glued to the card that bore the specimen. The color of the abdomen agreed with Walker's description. I have used illustrations of it to determine the species to which I have applied Walker's name, here. I have seen specimens of this species from Cuzco, Peru; Madre de Dios, Peru; Marcapata, Peru; and Blanca Flor, Bolivia.

43. Genus **BALEJA** Melichar

Figures 242-246

Baleja Melichar, 1926a:344. Type-species: *Tettigonia flavoguttata* Latreille, by subsequent designation of China, 1938d:184.

Length of male 8.8-12.1 mm, of female 9.3-11.5 mm.

Head well produced, median length of crown varying from three-fourths of to slightly greater than interocular width, and from slightly less than one-half to slightly more than seven-tenths transocular width, anterior margin narrowly rounded to acutely subangular in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with disk flat or (usually) shallowly concave, without a median fovea and without sculpturing or setae, lateral clypeal

sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins convex and oblique; clypeus flattened medially, muscle impressions distinct, clypellus with apical margin shallowly emarginate between apicolateral lobes, face almost without pubescence, transclypeal suture interrupted, clypellus with contour continuing profile of clypeus, or slightly more nearly horizontal (varying intraspecifically).

Thorax with pronotal width varying from slightly less than to slightly greater than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave; scutellum not striate behind transverse sulcus. Forewing with membrane including all or most of inner apical cell and portion of remaining apical cells, veins not very distinct, not elevated, with four apical cells, the base of fourth usually nearly a continuation of transverse base of third, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced with apical margin concave or convex, with macrosetae variable interspecifically, with or without an apical or ventroapical short tapered acute process on each side. Plates short triangular, not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae. Style extending posteriorly to a degree variable interspecifically with respect to apex of connective, without a conspicuous preapical lobe. Connective Y- or V-shaped, keeled. Aedeagus symmetrical, with or without processes (variable intraspecifically). Paraphyses absent, or vestigial.

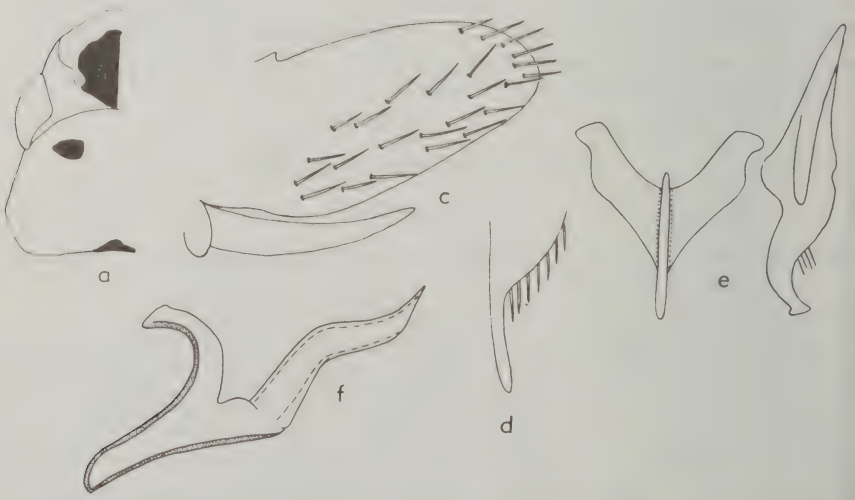


FIGURE 242.—*Baleja rufofasciata* (Distant) (*f* from specimen from Ecuador; remainder from Costa Rica).

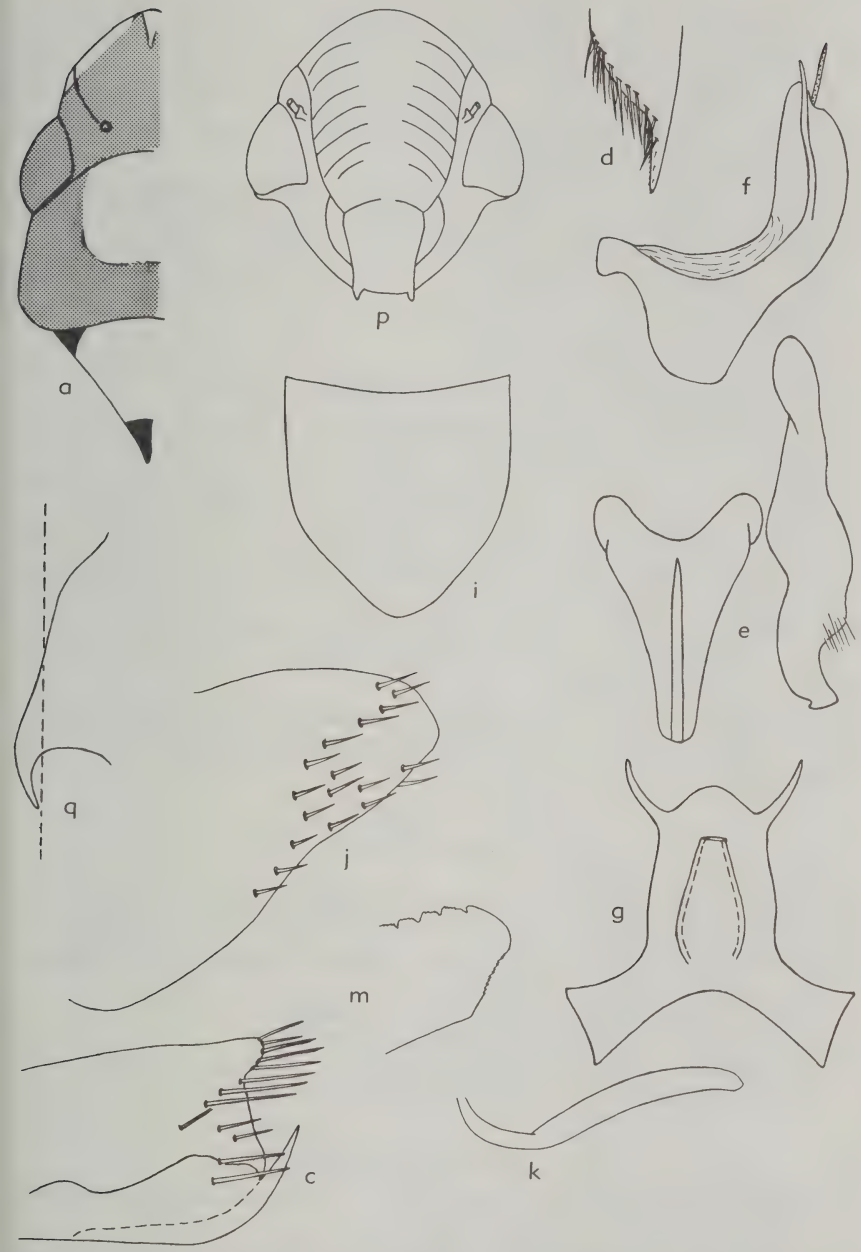


FIGURE 243.—*Baleja flavoguttata* (Latreille) (*i-k, m,* from specimen from Turrialba, Costa Rica; remainder from specimens from Panama Canal Zone; plate not shown in *c*): *p,* Face; *q,* male pygofer apex, left side, from ventral view.

Female abdominal sternum VII with posterior margin moderately convex. Ovipositor with second valvulae each expanded beyond basal curvature and with large quadrate primary teeth extending almost to apex, each with a number of minute secondaries, apex rounded, posteroventral margin slightly concave and with a number of minute denticulations. Pygofer with a number of macrosetae on dorsal two-thirds.

Specimens belonging to *Baleja* Melichar have been seen from Costa Rica, Panama, Gorgona Island, Colombia, French Guiana, and Brazil. *Baleja* belongs in the *Paromenia* complex of genera and shares with *Jozima*, new genus, and *Parathona* Melichar the peculiar form of the apex of the clypellus, but none of the species are as delicate as *Jozima*, and none have the aedeagal apex decurved in lateral view.

The present interpretation of *Tettigonia flavoguttata* Latreille is based on Central American specimens determined by Melichar in MHNP.

My identification of *Tettigonia rufofasciata* Distant is based on a study of the female lectotype and a dissection of a male compared with it, and the genitalia of the male lectotype of *T. detracta* Fowler are closely similar. I have also studied the genitalia of the male lectotype of *T. ostrina* Fowler. There are four color varieties of *Baleja rufofasciata* (Distant) at hand, one typical, one like typical *ostrina*, one from Ecuador, and one from Gorgona Island (off Colombia) the last two hitherto not mentioned in the literature; all are without intergrades, but I have not found other characters wherein they are distinct.

My identification of *Aulacizes marginula* Osborn is based on the holotype from the Carnegie Museum.

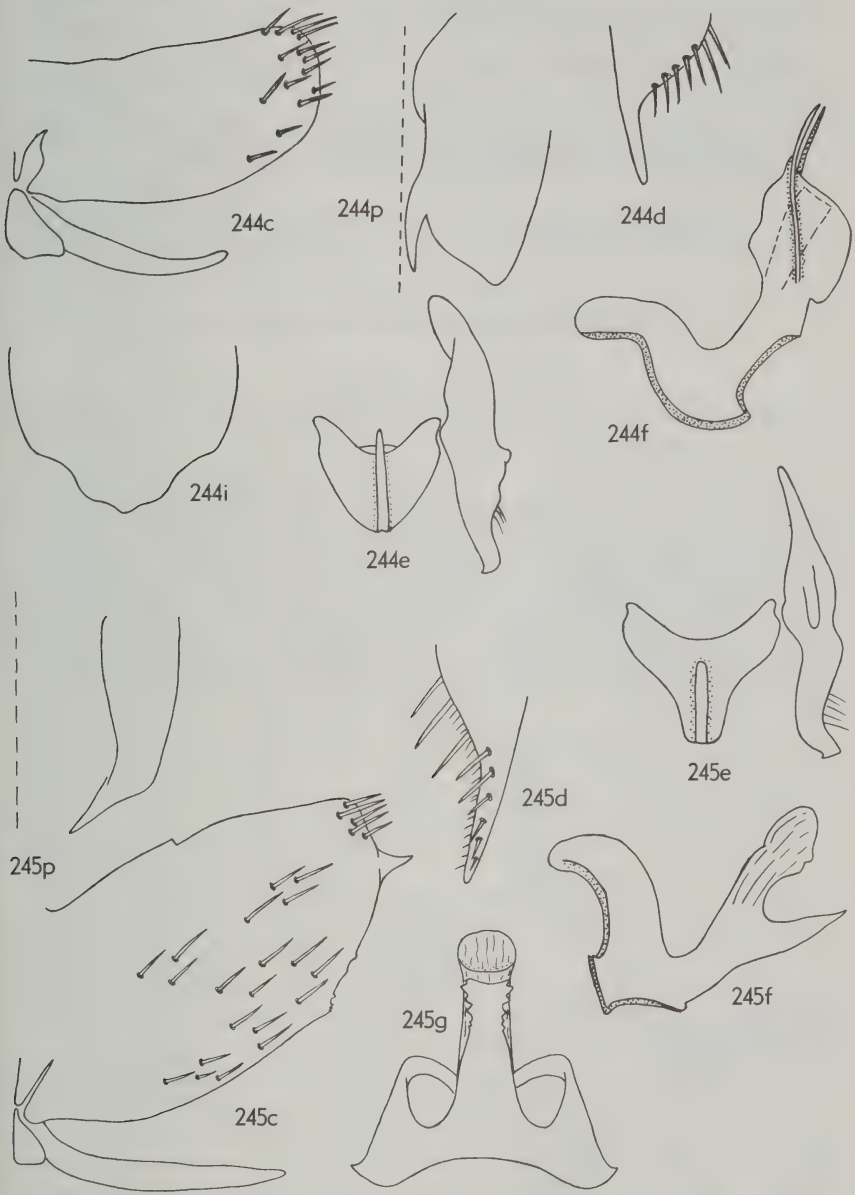
The genitalia of the male lectotype of *Tettigonia serratula* Breddin agree with the illustrations published here, as do those of the lectotype of *Diedrocephala cleora* Distant.

SPECIES OF *BALEJA*

discordans, n. sp. Colombia.
flavoguttata (Latreille), 1811a:171 (*Tettigonia*). Nicaragua, Costa Rica, Panama.
marginula (Osborn), 1926b:168 (*Aulacizes*). Fr. Guiana, Bolivia. New combination.
rufofasciata (Distant), 1879b:63 (*Tettigonia*). Costa Rica, Gorgona Island, Colombia, Ecuador. New combination.
ostrina (Fowler), 1900a:257 (*Tettigonia*). New synonymy.
detracta (Fowler), 1900a:258 (*Tettigonia*). New synonymy.
serratula (Breddin), 1902b:2 (*Tettigonia*). Ecuador. New combination.
cleora (Distant), 1908b:59 (*Diedrocephala*). New synonymy.

KEY TO MALES OF *BALEJA*

1. Aedeagus without processes ..... *rufofasciata* (Distant) (fig. 242)
   Aedeagus with one or more processes 2
2. Aedeagus with a pair of filamentous processes arising laterally on shaft and extending beyond apex 3
   Aedeagus with one median unpaired ventral process 4



FIGURES 244, 245.—244, *Baleja serratula* (Breddin) (*f* from specimen from Cachabé, Ecuador; *i* from Puerto Barrio, Colombia; remainder from Guayaquil, Ecuador): *p*, Male pygofer apex, left side, from ventral view. 245, *B. discordans*, n. sp., holotype: *p*, Male pygofer apex, left side, from ventral view.

3. Connective extending posteriorly beyond style apex; pygofer with posterior margin concave ..... *flavoguttata* (Latreille) (fig. 243)
   Connective not extending posteriorly as far as style apex; pygofer convex apically ..... *serratula* (Breddin) (fig. 244)

4. Style extending posteriorly beyond apex of connective; with a median pronotal spot and two claval spots on each wing, yellow
   discordans, n. sp.
   Style not extending posteriorly as far as apex of connective; without any of the spots mentioned above ..... *marginula* (Osborn) (fig. 246)

Baleja discordans, NEW SPECIES

FIGURE 245, PAGE 299

Length of male 10.0 mm. Head with median length of crown slightly less than nine-tenths interocular width and slightly less than six-tenths transocular width, anterior margin sharply rounded in dorsal view, crown with disk flat. Thorax with pronotal width slightly less than transocular width of head, lateral margins parallel. Male pygofer with apical margin slightly convex, with widely spaced macrosetae on disk and a group of close-set macrosetae near posterodorsal margin, with an apical process; style extending posteriorly slightly farther than apex of connective, which is Y-shaped with the arms widely divergent; aedeagus with a ventral process which is flattened, with its lateral anteapical margins dentate, and concavely truncate at apex. Female unknown.

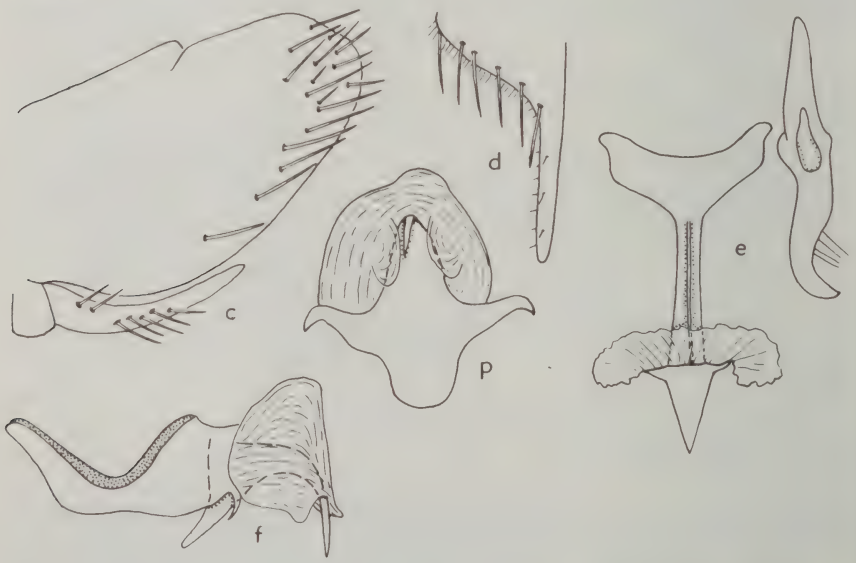


FIGURE 246.—*Baleja marginula* (Osborn), holotype (*e* showing paraphysis): *p*, Aedeagal apex from anterior view.

Color of crown and pronotum castaneous, with a bright yellow median oval spot extending from anterior margin of pronotum over four-fifths of its median length; scutellum yellow except basal and apical angles which are castaneous; forewing mostly brown and yellow, the brown area including clavus except for a midclaval yellow spot, and including inner portion of apical two-thirds of corium, enclosing a yellow spot at apex of brachial cell, the outer edge of the brown area very irregular, with an arc of red at bases of apical cells; face, venter, and legs, yellow.

Holotype male, and one male topotype Buenaventura, Colombia, October 19-21, 1909 (R. Paessler) (ZIMH).

Baleja discordans, n. sp., differs markedly from the other species in the genus in that the aedeagus has paired and unpaired ventral processes.

44. LEBAJA, NEW GENUS

FIGURE 247

Type-species: *Lebaja mediana*, n. sp.

Length of male 8.1-8.3 mm, of female 8.0-8.9 mm.

Head well produced, median length of crown varying from slightly less than nine-tenths of, to slightly greater than interocular width, and from slightly less than six-tenths to two-thirds transocular width, anterior margin narrowly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown with a median fovea extending full length, disk without sculpturing or setae, lateral clypeal sutures extending onto crown and almost attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins broadly convex; clypeus slightly flattened medially, muscle impressions not very distinct, transclypeal suture obsolete medially, clypellus with contour continuing profile of clypeus, its apex broadly truncate.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave; scutellum not striate behind transverse sulcus. Forewing hyaline except longitudinal translucent dark markings, veins distinct, not elevated, with three closed anteapical cells, their bases slightly proximal to transverse line through claval apex, with four apical cells of which base of fourth is more proximal than base of third, second apical cell narrowed to apical wing margin which is concave at apex of that cell; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced with apical margin broadly convex, with large macrosetae not uniformly arranged, occurring on dorsal portion of disk, without processes. Plates triangular, gradually tapered, not extending posteriorly as far as pygofer apex, with uniseriate macrosetae. Style not extending posteriorly as far as apex of connective, with a lateral lobe near midlength, apex narrowly truncate. Connective Y-shaped, keeled. Aedeagus

symmetrical, in lateral view broader in apical half, without processes. Paraphyses absent.

Female abdominal sternum VII moderately produced, keeled medially, posterior margin almost regularly convex. Ovipositor with second valvulae each broadened throughout portion beyond basal curvature, each with dorsal margin convex and bearing numerous close-set quadrate teeth, ventral margin not concave, with numerous minute anteapical posteroventral denticles, apex acute. Pygofer with numerous large macrosetae on posterior half.

Specimens of *Lebaja*, new genus, are brown or black with a conspicuous median pale vitta on the anterior dorsum. They are superficially similar to specimens of *Diedrocephala* Spinola, or *Baleja* Melichar.

Lebaja occurs in southern Brazil. It differs from *Baleja* conspicuously in its median coronal fovea and in the concavity at the apex of the forewing, and in the second valvula of the ovipositor which is acute (much like the present illustration of *Plerogonalia* (fig. 434*k*)) apically, and with the ventral margin not concave.

Lebaja mediana, NEW SPECIES

FIGURE 247

Structural characters as in generic description. Color of crown and pronotum brown to black with a broad median yellow vitta on pronotum continuing anteriorly onto crown to a variable extent, in some specimens only

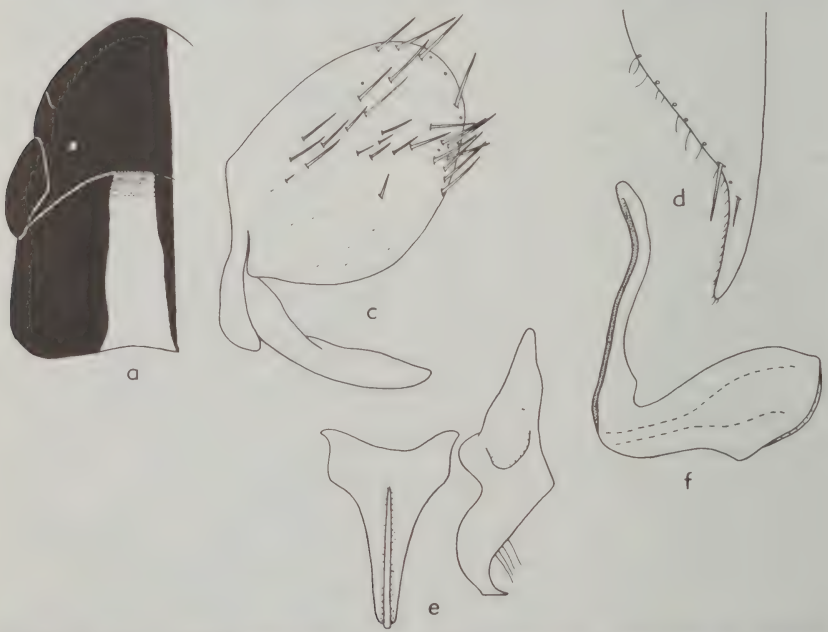


FIGURE 247.—*Lebaja mediana*, n. sp. (from specimen from Vicosa, Minas Gerais, Brazil).

slightly, in others attaining apex of head (extending past midlength of crown in holotype), and posteriorly across pronotum and almost to apices of forewings at rest, abruptly and slightly broadened before posterior extremity, the delimiting dark pronotal borders of the vitta continuing posteriorly to include the basal scutellar angles and forming a zigzag vitta on each forewing to the apex of the latter, the hyaline costal area of each wing interrupted by at least one extension of the dark zigzag line towards the costal margin; face, thoracic pleura, and legs, yellow.

Holotype male, Vicosa, Minas Gerais, Brazil, June, 1933 (E. J. Hambleton), on Leguminosae; one female, Vicosa, Minas Gerais, Lor[ena?], Brazil, May, 1931 (E. J. Hambleton), on grass and weeds; one male, same locality as last, March 21, 1933 (E. J. Hambleton), on *P. scoparium* (USNM). One female, Piracicaba, São Paulo, Brazil, March 28, 1965 (W. E. and C. A. Triplehorn (OSU)). One male, Corumbá, Mato Grosso, Brazil; one female, São Paulo, Brazil, 1898 (Noualhier); and one female, Espírito Santo, Brazil, 1898 (Noualhier) (MMB).

45. Genus **PARATHONA** Melichar

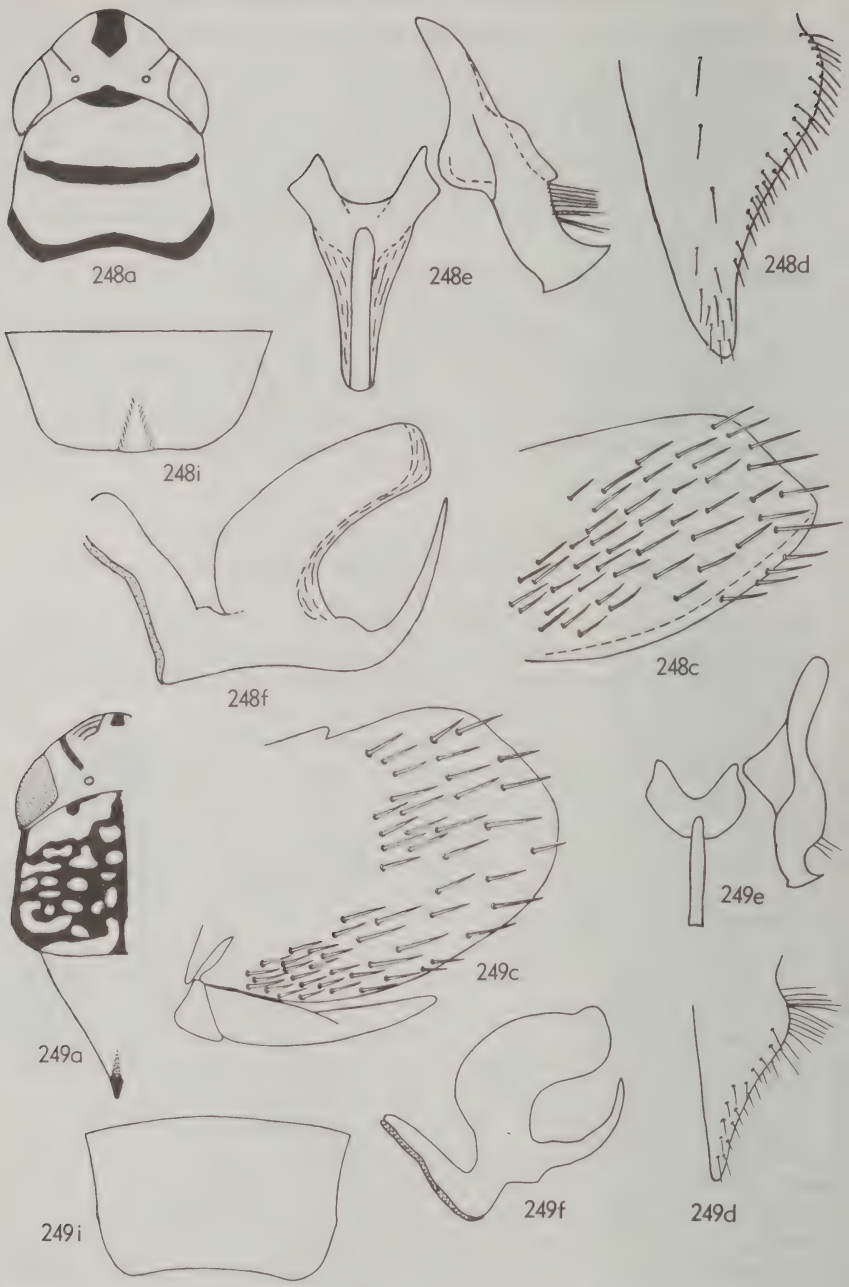
Figures 248-251

Parathona Melichar (1926a:330). Type-species: *Cicada lyncea* Fabricius (1787a:269), preoccupied = *Cicada cayennensis* Gmelin (1798a:2105), by original designation.

Length of male 8.3-10.0 mm, of female 8.3-9.1 mm.

Head slightly to moderately produced, median length of crown from four-tenths to more than two-thirds interocular width and from one-fourth to slightly more than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition to face, ocelli located well behind a line between anterior eye angles, usually close to posterior margin of head, the relative distance from adjacent inner eye margin and median line of crown variable interspecifically, crown with a transverse concavity across ocelli, surface minutely pitted anteriorly with some of the pits lenticular, without setae, lateral clypeal sutures extending onto crown and usually attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins obliquely convex or rectilinear; clypeus with muscle impressions distinct or not, transclypeal suture obscure medially, clypellus not produced, its profile continuing profile of clypeus, apical margin concave.

Thorax with pronotal width variable interspecifically compared with transocular width of head, lateral margins slightly convergent anteriorly, disk usually transversely rugose, dorsopleural carinae complete or not, posterior margin concave; scutellum glabrous or rugulose behind transverse sulcus. Forewing varying from almost completely membranous (*P. cayennensis* Gmelin) to coriaceous except for apical membrane that includes all of apical cells (all other species), with veins usually distinct, with three closed anteapical cells of which the bases are located opposite claval apex or more basally, with four apical cells of which base of outermost is more proximal than base of third; forewings of female in rest position exceeding apex of ovipositor. Hindleg with



FIGURES 248, 249.—248, *Parathona cayennensis* (Gmelin) (from specimens from Panama City, Panama; plate not shown in *c*). 249, *P. interstitialis* (Signoret) (*i* from lectotype; remainder from specimen from Provincia del Sara, Bolivia).

femoral setal formula 2:1:1, length of first tarsomere approximately equal to or greater than combined length of two more distal tarsomeres.

Male genitalia: Pygofer moderately produced, posterior margin convex, setae variable interspecifically. Plates triangular, very short, not extending nearly as far posteriorly as pygofer apex, with uniseriate macrosetae or with numerous multiseriate microsetae. Style variable interspecifically in length with respect to apex of connective, but not extending posteriorly beyond it. Connective Y-shaped, with a median keel. Aedeagus symmetrical, with a single ventral tapered process which is acute apically, arising at base and curved gradually dorsally throughout its length; shaft broad in lateral view and convex apically. Paraphyses absent.

Female abdominal sternum VII with posterior margin varying from almost rectilinear to angulate at apex. Pygofer with macrosetae variable interspecifically. Ovipositor with second valvulae broadened in three-fourths to almost all of portion beyond basal curvature, and bearing quadrate teeth. Pygofer with macrosetae varying interspecifically (all of female description based on dissections of *gratiosa* (Blanchard) and *cayennensis*).

I have seen specimens of *Parathona* Melichar from Panama, Trinidad, Venezuela, Colombia, Bolivia, and central and southeastern Brazil to Paraguay and Argentina. Metcalf (1965a:649) cited published records from Mexico and French Guiana for *P. cayennensis* (Gmelin), as well as from India. The Indian record (Evans 1947a:170) is undoubtedly an error. Nothing is known of the biology of this genus. The relationship of *Parathona* to other

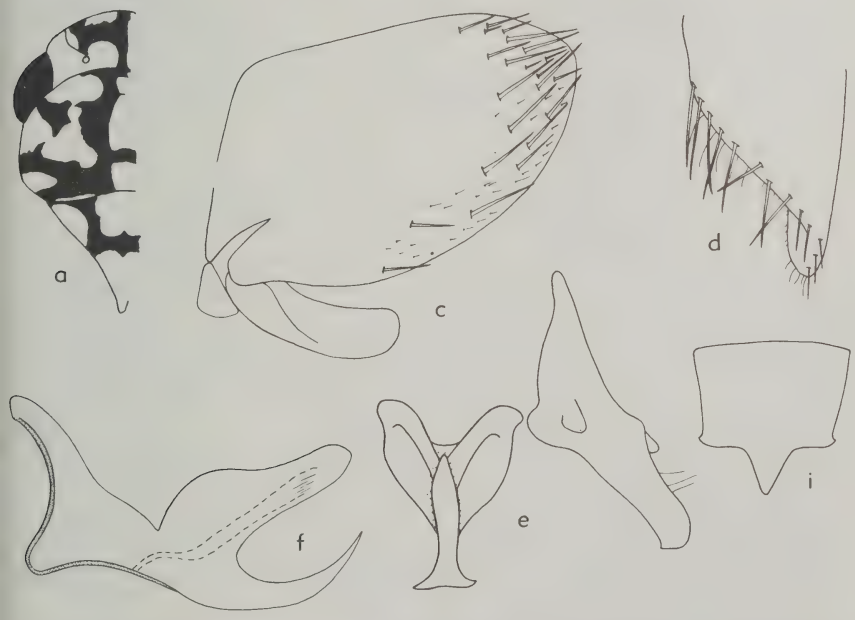


FIGURE 250.—*Parathona albostriata* (Signoret) (*i* from lectotype; remainder from specimen from Vicosa, Minas Gerais, Brazil).

genera is problematical. I have placed it close to *Baleja* Melichar because of the concave clypellus, shared by both, because of the similarity of the second valvulae of the ovipositor of *P. gratiosa* (Blanchard) to the same structure in *Baleja*, and because the common form of the aedeagus in *Parathona* is near that of *B. discordans*, n. sp.. Externally, the species of *Parathona* are similar to *Scoposcartula*, new genus. *Parathona* species are more robust than *Baleja* and with the head less produced. Also, the apical membrane of the forewing is more extensive in *Parathona*. It seems to be related also to *Sailerana*, new genus, in the discussion of which distinguishing characters are noted.

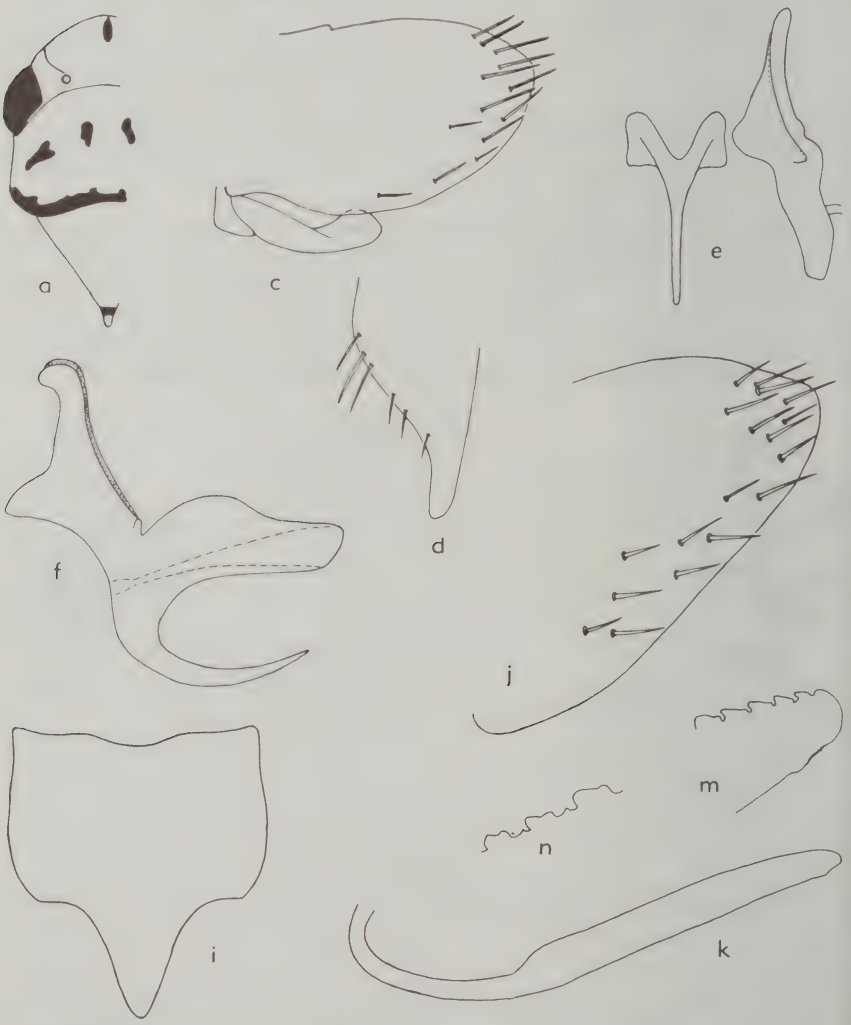


FIGURE 251—*Parathona gratiosa* (Blanchard) (*a*, *i-k*, *m*, *n*, from specimen from Mato Grosso, Brazil; remainder from Misiones, Argentina).

The present identification of *Tettigonia albostriata* Signoret is based on a comparison of females with sketches of the type made by the writer in Vienna, and males associated with these females.

Parathona gratiosa (Blanchard) rests on a comparison of specimens determined by Signoret, in Vienna, with illustrations of the male genitalia published here. The interpretation agrees with Melichar-determined specimens in the museum in Budapest. I have identified *Tettigonia drewseni* Stål with *gratiosa* as a result of comparing specimens of *gratiosa* from northern Argentina with Stål's original description.

P. interstitialis (Signoret), as here interpreted, rests on a comparison of a specimen from the Carnegie Museum with the original illustration of this species.

The writer has not seen a typical specimen of (*P. lyncea* (Fabricius)) = *P. cayennensis* (Gmelin). The holotypes of the synonymous *Tettigonia cyanescens* Walker and *Cicada myopa* Fabricius have been studied.

SPECIES OF *PARATHONA*

albostriata (Signoret), 1853b:366 (*Tettigonia*). SE. Brazil. New combination.

cayennensis (Gmelin), 1798a:2105 (*Cicada*) (new name for *Cicada lyncea* Fabricius), Panama, Trinidad, Colombia, Venezuela.

lyncea (Fabricius), 1787a:269 (*Cicada*) (preoccupied).

myopa (Fabricius), 1794a:33 (*Cicada*).

cyanescens (Walker), 1851b:760 (*Tettigonia*).

gratiosa (Blanchard), 1840a:191 (*Tettigonia*). Central and SE. Brazil, Bolivia, Paraguay, Argentina. New combination.

drewseni (Stål), 1855b:192 (*Tettigonia*). New synonymy.

interstitialis (Signoret), 1855d:789 (*Tettigonia*). Bolivia. New combination.

KEY TO SPECIES OF *PARATHONA*

1. Forewing with a suboval black-bordered hyaline area in corium opposite apical portion of clavus ..... *cayennensis* (Gmelin) (fig. 248)
   Forewing without such a hyaline area 2

2. Male pygofer with macrosetae very numerous, extending from middle of disk to posterior and posteroventral margins; forewing brown with narrow white stripes between the longitudinal veins
   interstitialis (Signoret) (fig. 249)
   Male pygofer with macrosetae more restricted, not present on middle of disk; forewing marked otherwise 3

3. Clypeus with a pair of dorsal and one median black-bordered oval yellow spots ..... *albostriata* (Signoret) (fig. 250)
   Clypeus pale, with or without a few black markings, without yellow spots ..... *gratiosa* (Blanchard) (fig. 251)

46. SAILERANA, NEW GENUS

FIGURES 252-256

Type-species: *Tettigonia solitaris* Signoret.

Length 8.0-9.5 mm.

Head moderately produced, median length of crown varying from slightly less than six-tenths to slightly more than seven-tenths interocular width and from slightly more than one-third to slightly less than one-half transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with or without a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and varying (intraspecifically) from convex to rectilinear; clypeus not or only very slightly flattened medially, muscle impressions not very distinct, transclypeal suture obsolete medially, clypellus not produced, in profile with contour of its lower portion continuing that of remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk obscurely and sparsely punctulate, without distinct pubescence; scutellum not striate behind transverse sulcus. Forewing with membrane present, varying interspecifically in extent, veins not distinct, not elevated, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere equal to or slightly greater than combined length of two more distal tarsomeres and with very weak biseriate microsetae on plantar surface.

Male genitalia: Pygofer narrow and strongly produced posteriorly, posterior margin often bearing processes varying interspecifically, setae relatively few and occurring on apical half of pygofer. Plates slender, elongate triangular, extending posteriorly as far as or farther than pygofer apex, each with uniseriate macrosetae extending at least through apical half of plate. Style without preapical lobe. Connective short Y-shaped, not extending posteriorly nearly as far as style apices. Aedeagus symmetrical or nearly so, with shaft slender, curved gradually posterodorsally, usually without apical processes, usually with a pair of slender, acute processes arising at base of shaft, symmetrical or not, of varying length intraspecifically. Paraphyses usually absent (vestigial in an undetermined species).

Female abdominal sternum VII not strongly produced, posterior margin straight or slightly emarginate, with a broad very slight median projection. Dorsal membrane of genital chamber without sclerites. Ovipositor with valvulae II each expanded beyond basal curvature, dorsal margin of expanded portion bearing uniform subquadrate primary teeth, without secondaries,

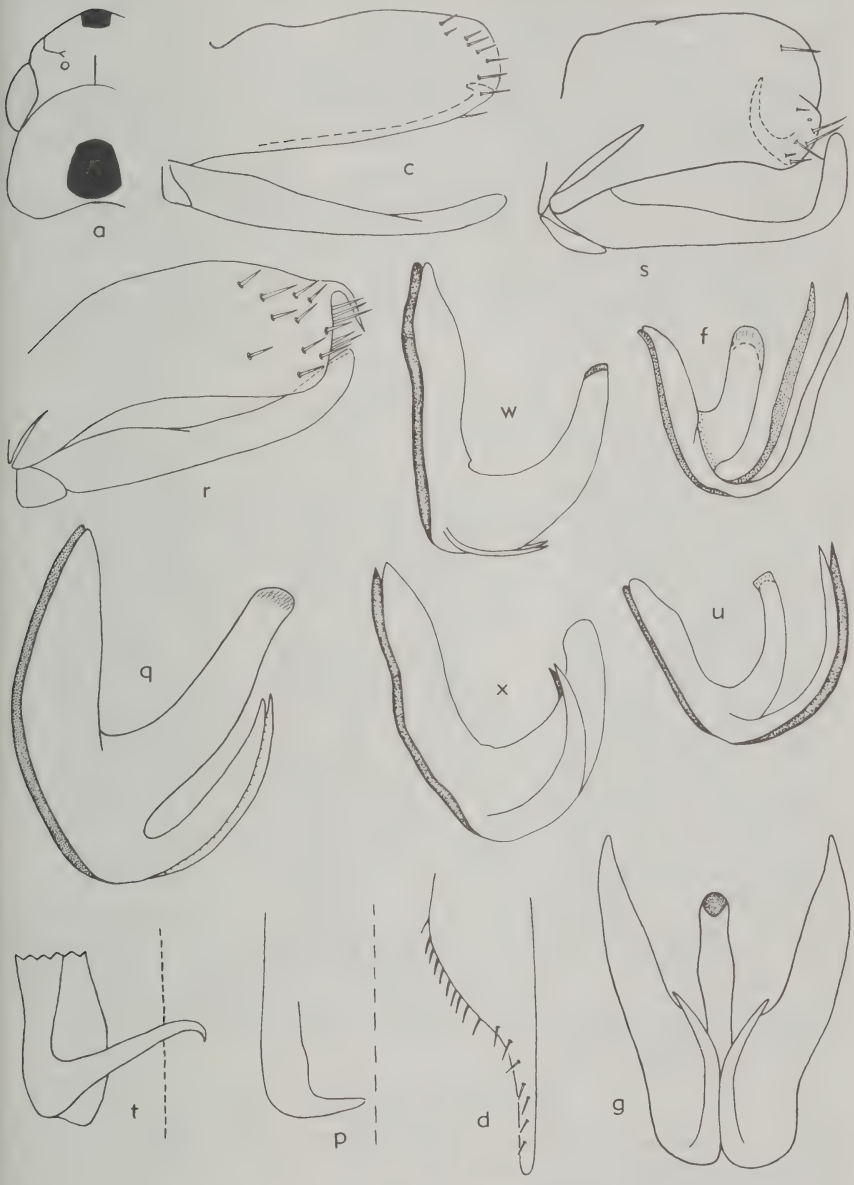


FIGURE 252.—*Sailerana solitaris* (Signoret) (see also fig. 253) (*c*, *p*, *f*, from specimen from Rio Purús, Brazil; *r*, *x*, from Caqueta, Colombia; *u*, from Fontebõa, Amazonas, Brazil; *w*, from S. Gabriel, Brazil; remainder from Peru): *r*, *s*, Male pygofer and plate, from lateral view; *q*, *u*, *w*, *x*, aedeagus from lateral view; *p*, *t*, male pygofer apex, right side, from ventral view.

throughout its length almost to apex; with preapical posteroventral small denticles; apex broadly rounded. Pygofer acute apically, with irregularly arranged setae parallel to posteroventral margin.

Species of *Sailerana*, new genus, are pale orange to yellow with an apical black spot on the crown, a median pronotal dark spot, transverse or oblique narrow black to brown bands on the forewings in rest position, and a narrow black line on the anterior tibiae.

Sailerana occurs in Trinidad Island; French and British Guiana; Pará, Brazil; the Amazon Valley in Brazil; Colombia; and Peru. I have placed it near Melichar's *Parathona*, *Tacora*, and *Baleja* mostly because of similarity of the female genitalia. In general appearance, species are similar to some species of *Parathona*, but the shaft of the aedeagus is arched dorsad, instead of caudad as in *Parathona*. Species of *Sailerana* are smaller (length up to 9.5 mm) than *Tacora* (at least 12.4 mm), are less strikingly colored, and lack the red spot on the base of the jugum of the hindwing.

Although I have studied and made drawings of the female lectotype of *Cardioscarta multiplicator* Melichar, I'm not certain that the male illustrated here (fig. 256) is correctly identified. It is the only male with a typical color pattern I have seen from eastern Brazil, but it seems probable that the aedeagus is abnormal. A male specimen determined by Melichar in the Hungarian Natural History Museum, from Pachitea, Peru belongs to a different species that is not described here. It differs from the other species in having a ramose pygofer process.

Tettigonia peruviana Signoret is placed in synonymy here under *solitaris* Signoret, on the basis of a study and dissection of the male lectotype of *peruviana*. These agreed well with figures 252*g*, *q*, *s*, and *t*. The original illustration of *solitaris* is a variety of a variable species to which typically colored *peruviana* also belongs. The lectotype of *Strictogonia projecta* Melichar is without an abdomen. I place this nominal species in synonymy with *solitaris* because my sketch of the lectotype is close to specimens of *solitaris* except for the abruptly narrowed anterior portion of the pronotum. It is not congeneric with *Cicada unifasciata* Fabricius.

Sailerana, new genus, is named in honor of Dr. Reece I. Sailer whose efforts have contributed much to our knowledge of entomology and to the efforts of other entomologists in this generation. His aid after a serious automobile accident in France in the course of the present study contributed directly to my ability to complete the work.

SPECIES OF *SAILERANA*

multiplicator (Melichar), 1932a:304 (*Cardioscarta*). E. Brazil. New combination.

solitaris (Signoret), 1853b:346 (*Tettigonia*). Fr. and Br. Guiana, Colombia, centr. Brazil, Peru. New combination.

peruviana (Signoret), 1862d:587 (*Tettigonia*). New synonymy.

projecta (Melichar), 1926a:358 (*Strictogonia*). New synonymy.

myersi, n. sp. Trinidad Is., Brazil.

vanvelzeni, n. sp. Peru, W. Brazil.

KEY TO MALES OF *SAILERANA*

(*S. multiplicator?* (Melichar) (fig. 256) not included)

1. Forewings at rest without transverse bands or with two, of which anteriormost does not extend anteriorly on each wing along margin next scutellum ..... *solitaris* (Signoret) (figs. 252, 253)
   Forewings at rest with two transverse bands of which anteriormost extends forward along commissural margin of each wing, thence along humeral margin (interrupted in *vanvelzeni*) 2
2. Pygofer strongly narrowed apically, ending in an acute process ..... *vanvelzeni*, n. sp.
   Pygofer broad apically, with a posteroventral angle, but without a distinct process ..... *myersi*, n. sp.

Sailerana vanvelzeni, NEW SPECIES

FIGURE 254

Length of male 8.1-8.7 mm. Median length of crown approximately two-thirds interocular width and varying from slightly more than one-third to approximately four-tenths transocular width, crown without a transverse concavity across ocelli. Forewing with membrane including all of inner three apical cells and most of outer apical cell. Male with pygofer gradually tapered to acute apical process which is curved posteromesally almost to median line; plates with uniseriate macrosetae on slightly more than apical half; aedeagal shaft curved regularly dorsally, with a pair of ventral asymmetrical processes arising near base of shaft, each slender and tapering, extending posteriorly.

Color of dorsum uniform dull orange, pronotal spot castaneous, almost touching posterior pronotal margin in type, occurring slightly more anteriorly in second specimen at hand; bands of forewings castaneous, the more posterior one of uniform width, extending at right angles to commissural margin from near costal margin to claval apex, the more anterior one extending from near costal margin to commissural margin behind scutellum, narrowed and continuing anteriorly then along humeral margin as far as transverse scutellar depression in type, not as far in second specimen, humeral margin with a purple spot near base.

Holotype and one additional male, Pucallpa, Loreto Province, Peru, August 3 and August 5 (holotype), 1962 (W. T. Van Velzen) (USNM).

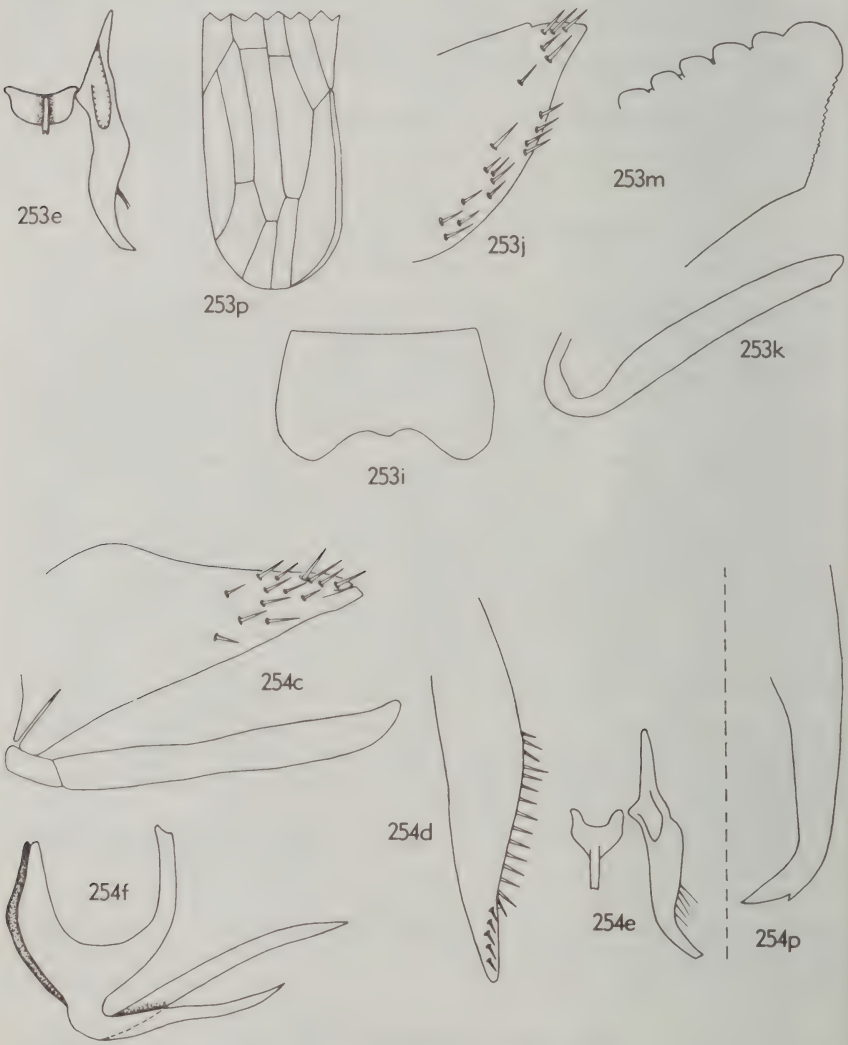
The form of the pygofer of the male will separate *S. vanvelzeni* readily from the other species of the genus. The species is named in honor of the collector of the two specimens I have studied.

Sailerana myersi, NEW SPECIES

FIGURE 255, PAGE 314

Length of male 7.5 mm, of female 8.4 mm. Median length of crown from slightly less than two-thirds to slightly more than seven-tenths interocular

width, and approximately four-tenths transocular width, crown with a transverse concavity across ocelli, antennal ledges not carinate. Forewing with membrane as in *S. vanvelzeni*, n. sp. (above). Male pygofer truncate apically, without processes, other genital characters as in *vanvelzeni* except that aedeagal shaft is slightly bisinuate in lateral view and curved more strongly than in *vanvelzeni*.



FIGURES 253, 254.—253, *Sailerana solitaris* (Signoret) (see also fig. 252) (*e* from specimen from Peru; *p* from Fontebõa, Amazonas, Brazil; remainder from Colombia): *p*, Apical portion of forewing. 254, *S. vanvelzeni*, n. sp., holotype: *p*, Male pygofer, left side, from ventral view.

Ground color of dorsum as in *vanvelzeni,* median pronotal spot touching posterior margin in type, almost completely absent in other specimen at hand, forewings with both bands attaining costa, both with a narrow sector on each wing adjacent to costa, anterior band extending forward to humeral margin thence almost to wing base without interruption, apex of forewings fumose.

Holotype male, St. John's Valley, Trinidad, February 10, 1929 (J. G. Myers), "B.M. 1929-170", and one female, without legs, Trinidad, January 13, 1929 (J. G. Myers), "B.M. 1929-170" (BM).

S. myersi, n. sp., is similar in structure to *S. vanvelzeni,* n. sp., but differs in the form of the pygofer and of the aedeagus of the male, and in the color characters as stated in the description. The species is named in honor of John G. Myers who contributed much to our knowledge of auchenorrhynchous Homoptera and who collected the only specimens I have seen.

47. Genus **TACORA** Melichar

Figures 257-258

Tacora Melichar, 1926a:359. Type-species: *Tettigonia dilecta* Walker, by original designation.

Length 12.4-15.6 mm.

Head strongly produced, median length of crown varying from slightly more than three-fourths to almost equal to interocular width and from slightly more than four-tenths to slightly more than five-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, crown without a concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and rectilinear; clypeus convex, muscle impressions distinct, transclypeal suture obscure, clypellus not strongly produced, its contour continuing profile of lower portion of clypeus and more nearly horizontal than upper portion of clypeus.

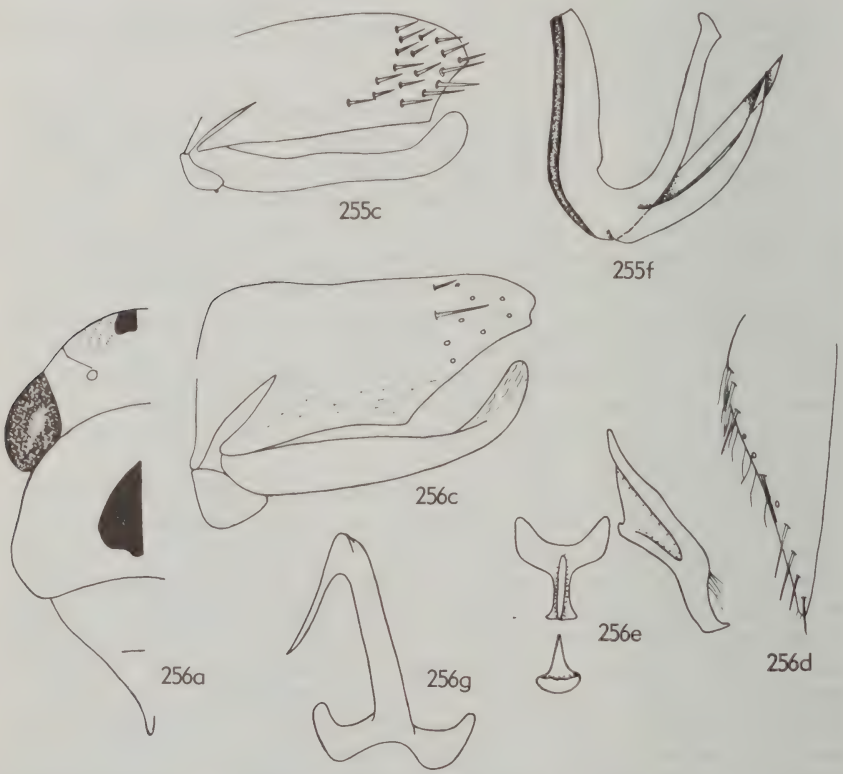
Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin slightly concave, disk without sculpturing or pubescence; scutellum not striate behind transverse sulcus. Forewing with membrane including all of apical cells except short basal portions of second, third, and fourth, veins indistinct except at wing apex, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture of clavus coriaceous, of corium varying from entirely coriaceous to mostly translucent, without sculpturing; forewings of female in rest position exceeding ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, strongly narrowed dorsoapically into a slender acute process which extends mesally towards or across median

line, with a number of macrosetae on apical half of pygofer. Plates varying interspecifically in shape and length, with uniseriate macrosetae. Style without preapical lobe, extending posteriorly as far as, or farther than apex of connective. Connective broadly Y-shaped; aedeagus narrowest in basal half, gradually broader in apical half, apex convex, with or without apical processes.

Female abdominal sternum VII moderately produced with posterior margin broadly convex. Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvulae each expanded beyond basal curvature, the dorsal margin of expanded portion with numerous quadrate primary teeth of uniform size extending almost to apex, secondaries extremely small, with very minute denticles on convex dorsoapical and concave ventroapical margins, apex blunt, obtusangulate. Pygofer slender, almost acutangular at apex, with anteapical macrosetae.

Species of *Tacora* Melichar are strikingly marked, orange with maroon and sanguineous markings.



FIGURES 255, 256.—255, *Sailerana myersi*, n. sp., holotype. 256, *Sailerana* sp., probably *multiplicator* (Melichar) (from specimen from Pará, Brazil; vestigial paraphysis shown in *e*).

Specimens of *Tacora* have been examined from several places in the Amazon Valley of Brazil and from Colombia, and I have examined two females of an undescribed species one of which was collected in Tumupasa, Bolivia. *Tacora* is related to *Sailerana,* new genus, in the discussion of which distinguishing characters are treated. Both genera are related to *Baleja,* to which the female genitalia of *Tacora* bear a marked resemblance.

My interpretation of *Tettigonia dilecta* Walker is based on a study of the male holotype (fig. 257).

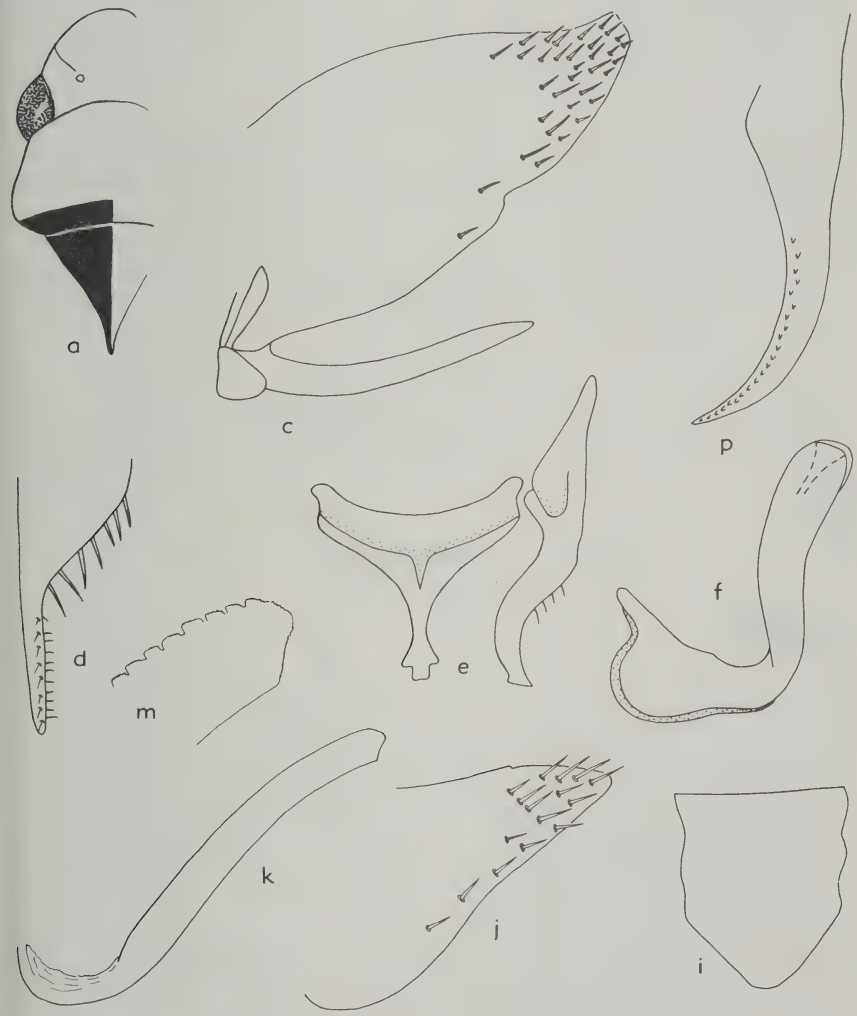


FIGURE 257.—*Tacora dilecta* (Walker) (*a, c-f, p,* from holotype; remainder from specimen from Teffé, Amazonas, Brazil): *p,* Male pygofer apex, from dorsal view.

SPECIES OF *TACORA*

dilecta (Walker), 1851b:747 (*Tettigonia*). N. Brazil.
saturata, n. sp. Colombia, N. and W. Brazil.

KEY TO SPECIES OF *TACORA*

Claval apex orange to yellow behind transverse dark stripe that intersects clavus before apex ..... *dilecta* (Walker) (fig. 257)
Claval apex maroon behind transverse dark stripe that intersects clavus before apex ..... *saturata*, n. sp.

Tacora saturata, NEW SPECIES

FIGURE 258

Length of male 12.4-14.0 mm, of female 12.9-15.6 mm. Head with median length of crown varying from slightly more than three-fourths to slightly more than nine-tenths interocular width, and from slightly less than five-tenths to slightly more than five-tenths transocular width. Male pygofer with apical attenuation extending posteromesally and crossing median line, without pegs; plates extending posteriorly beyond pygofer apex; style extending posteriorly

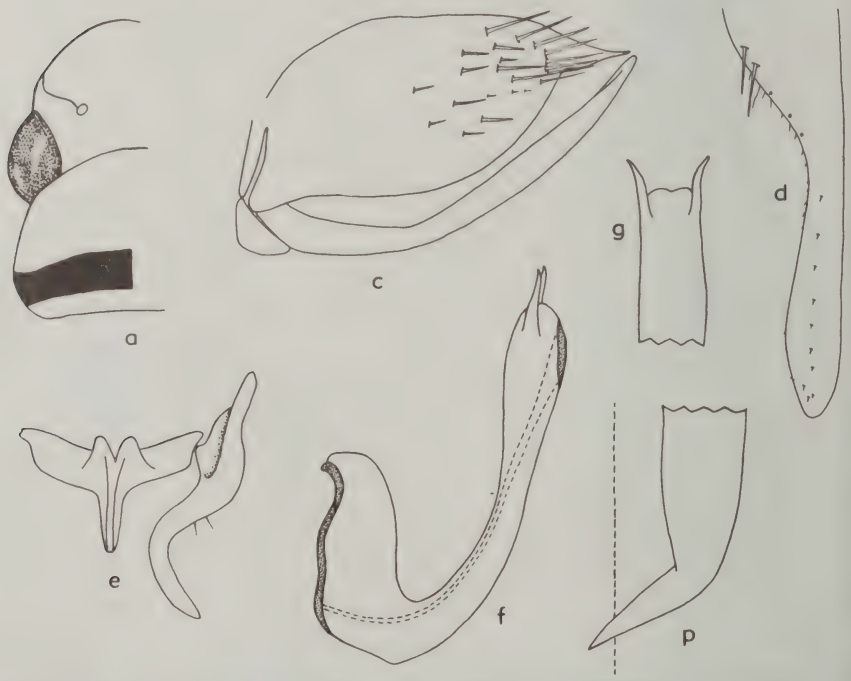


FIGURE 258.—*Tacora saturata*, n. sp., holotype (only aedeagal apex shown in *g*): *p*, Male pygofer apex, left side, from ventral view.

beyond apex of connective; aedeagus with a pair of short, symmetrical, lateral anteapical processes.

Head, pronotum, and scutellum, orange, with a transverse maroon to fuscous band across pronotum near posterior margin; forewings at rest with a transcommissural maroon to black somewhat "W"-shaped figure in basal half of clavi with the anterior angles and the posterior angle enclosing bright yellow markings, the anterior ones extending to the respective wing bases, the posterior one a transcommissural circle bordered posteriorly by maroon apical portions of clavi, corium translucent yellowish-orange, costal margin narrowly black to or near outer apical cell, with a maroon to black slightly diagonal stripe extending from near midlength of costal margin posteromesally to clavus just behind its yellow circle, with a red stripe on each wing extending in inner anteapical cell from claval apex along outer margin of inner apical cell to base of second apical cell then laterally across bases of apical cells; face orange, thoracic pleura and legs, yellow, the legs partly suffused with orange.

Holotype and one additional male, Colombia (L. Richter), and one female, Colombia (NCS). One male (teneral) and four females, Taracuá, Rio Uaupés, [Brazil], Swedish Amazon Expedition (Roman) (RMS). One male, "Jatahy", Brazil [ZIL]. One female, Porto Velho, Brazil, Stanford Expedition (Mann and Baker), and one male, Restrepo, Depto. Meta, Colombia, 500 m., August, 1936 (J. Becquaert) (MCZ). Holotype on indefinite loan to USNM.

T. saturata, n. sp., is similar in color to *T. dilecta* (Walker) from which it may be separated by the key characters, above. *T. dilecta* males have pegs on the attenuate apical portion of the pygofer, plates which do not attain the apical pygofer margin, and have no aedeagal processes, all of which differ from *saturata* males.

48. PUNAHUANA, NEW GENUS

FIGURES 259, 260

Type-species: *Cicadella brunneatula* Osborn

Length 8.9-11.3 mm.

Head weakly produced, anterior margin broadly rounded in dorsal view, median length of crown varying from approximately four-tenths to slightly less than six-tenths interocular width and from slightly less than one-fourth to almost four-tenths transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, surface of crown convex, usually not sculptured (exception: holotype of *P. dyscrita,* n. sp.), lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and almost rectilinear; clypeus very slightly convex or flattened, muscle impressions not distinct, transclypeal suture entire or interrupted medially, clypellus not strongly produced, but with contour of its lower portion more nearly horizontal than remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior

margin shallowly concave, surface not or only weakly rugose, scutellum not striate behind transverse sulcus. Forewing with an apical membrane, veins not very distinct, outer anteapical cell extending to wing margin and slightly longer than inner apical cell, remaining two anteapical cells with bases proximal to claval apex, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, narrowly rounded at apex, with numerous macrosetae on dorsal two-thirds, pygofer process arising anteroventrally and extending posterodorsally. Plates narrowly lobiform with apices rounded, extending posteriorly as far as pygofer apex, each with multiseriate macrosetae and numerous elongate microsetae. Style slender, tapered apically, without preapical lobe, extending posteriorly much farther than apex of connective; connective very short, not Y-shaped; aedeagus slender, extending posterodorsally, with a pair of short retrorse apical or anteapical processes. Paraphyses absent.

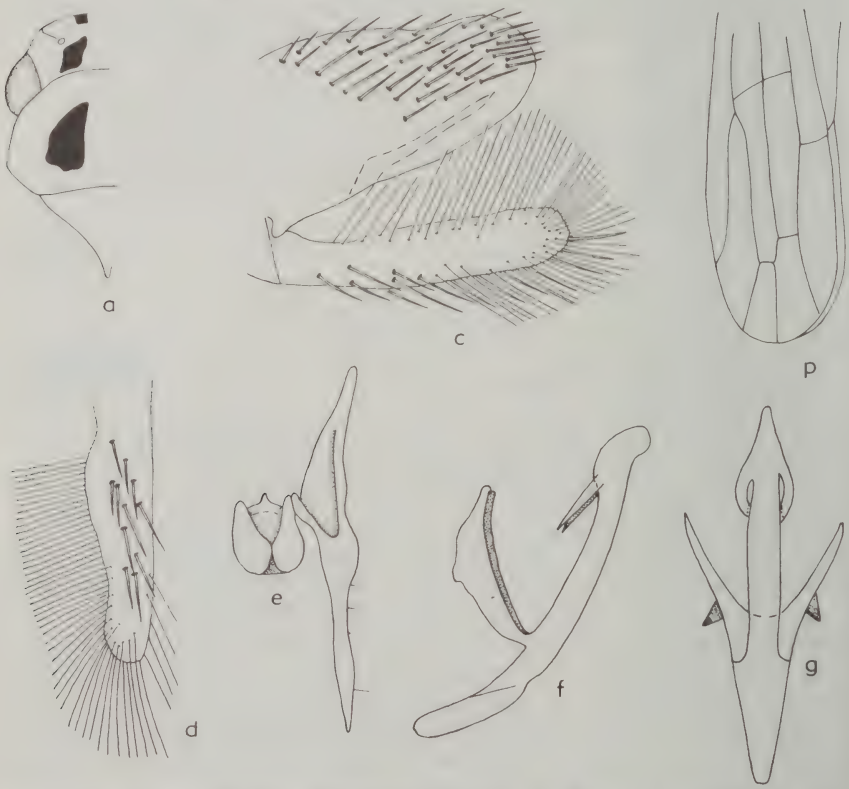


FIGURE 259.—*Punahuana brunneatula* (Osborn) (*a, c-g,* from holotype; *p* from specimen from "Sinchono", Peru): *p,* Apical portion of forewing.

Female abdominal sternum VII moderately produced with posterior margin broadly convex. Ovipositor with second valvula bearing numerous dorsal teeth beyond basal curvature almost to apex, the primaries bearing minute secondary denticles, apex acute with minute regular anteapical denticles on dorsal and posteroventral margins.

Specimens of *Punahuana* are dark orange with black markings. The range of the genus is Peru and Bolivia. The relationships between *Punahuana* and other genera are difficult to assess. The venation of the forewing, the simple form of the styles and the distribution of setae on the pygofer are somewhat like these features in *Trichogonia* Breddin, but the marked differences in the female genitalia indicate that there is not a close relationship. The male genitalia have features in common with *Backhoffella* Schmidt in the discussion of which distinguishing characters are treated.

In the illustration of the type of *Punahuana brunneatula* (Osborn) (fig. 259), the broader apex of the pygofer, as compared with that of *dyscrita,* n. sp., is misleading and peculiar to that particular specimen. The form illustrated for the latter species is common in both species.

SPECIES OF *PUNAHUANA*

brunneatula (Osborn), 1926b:185 (*Cicadella*). Peru, Bolivia. New combination.
dyscrita, n. sp. Peru, Bolivia.

KEY TO SPECIES OF *PUNAHUANA*

Pronotum with two separate black spots; aedeagus with processes anteapical ..... *brunneatula* (Osborn), (fig. 259)
Pronotum with a transverse uninterrupted black spot extending across median area, or without any black marking; aedeagus with process apical ..... *dyscrita,* n. sp.

Punahuana dyscrita, NEW SPECIES

FIGURE 260

Length of male 8.9-10.9 mm, of female 8.9-10.1 mm.

Head with median length of crown varying from slightly more than four-tenths to slightly less than six-tenths interocular width and from three-tenths to almost four-tenths transocular width; surface of disk with lenticular impressions (holotype) or not. Other structural characters as in generic description and like *Punahuana brunneatula* (Osborn), including male genitalia (fig. 259) except that aedeagal processes are apical instead of anteapical.

Ground color of dorsum, including the forewings, dark orange, crown with a basal and an apical median transverse spot (fused in holotype), usually a large spot occupying most of disk of pronotum, and a median spot in base of scutellum, black; clavus and inner portion of corium with dark streaks in the cells and an additional broader longitudinal dark stripe in corium and becoming broader apically to the wide dark wing apex; face, propleura, and basal portions of legs concolorous with ground color of dorsum, tibiae and tarsi darker.

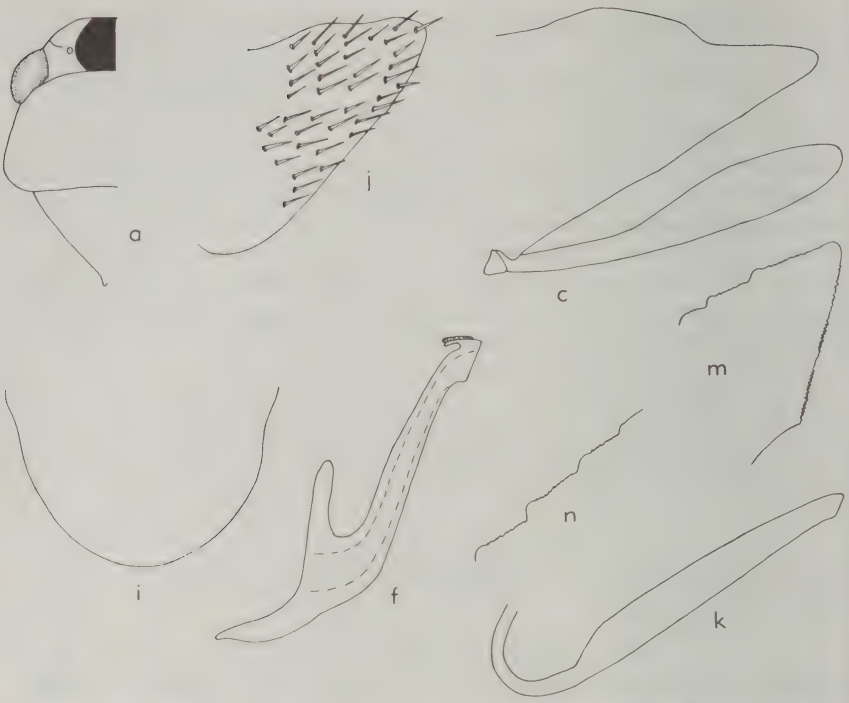


FIGURE 260.—*Punahuana dyscrita*, n. sp. (*a*, *c*, *f*, from holotype; remainder from specimen from Callanga, Peru; setae not shown in *c*).

Holotype male, "Sinchono", Peru (DeLong collection, OSU). One female, Callanga, Peru (NCS). One female, "Toungas de la Paz", Bolivia; "1903-188" (BM). One male, Yungas de la Paz, Bolivia; one female, Marcapata, Peru; and one female, Cochabamba, Bolivia, "Germain", "Noualhier", 1898 (MMB).

Punahuana dyscrita is very close to *P. brunneatula* (Osborn) from which it may be separated by the characters in the key. In a series of mixed specimens, *dyscrita* may be separated by its less robust form.

49. Genus **BACKHOFFELLA** Schmidt

Figure 261

Backhoffella Schmidt, 1928c:83. Type: *B. pulchra* Schmidt, *loc. cit.*, by original designation and monotypy.

Length of male 19 mm.

Head not strongly produced, truncate apically, median length slightly more than four-tenths interocular width and approximately three-tenths transocular width, anterior margin broadly rounded to face, ocelli located on a line between anterior eye angles, each about equidistant from median line of

crown and adjacent eye angle, disk of crown with a transverse concavity between ocelli, continuous with shallow depression on each side laterad of ocellus, surface with a few oblique rugosites mesad of each ocellus, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges slightly protuberant in dorsal aspect, in lateral aspect with anterior margins each obliquely convex; face with sparse pubescence below, clypeus flattened medially and with vermiculate rugosities, swollen laterally and with muscle impressions distinct, transclypeal suture obsolete, clypellus laterally compressed, contour of its lower portion at right angle to profile of face.

Thorax with pronotal width much greater than transocular width of head, lateral margins strongly convergent anteriorly, dorsopleural carinae almost complete (almost reaching eye), posterior margin convex, with a rectilinear transverse sulcus subtending anterior margin, disk strongly elevated, convex and weakly transversely rugulose at middle, without pubescence; scutellum not rugose on posterior half. Forewing with membrane including only inner apical cell, veins distinct, not elevated, with more than four apical cells, the base of fourth not more proximal than base of third, inner anteapical cell

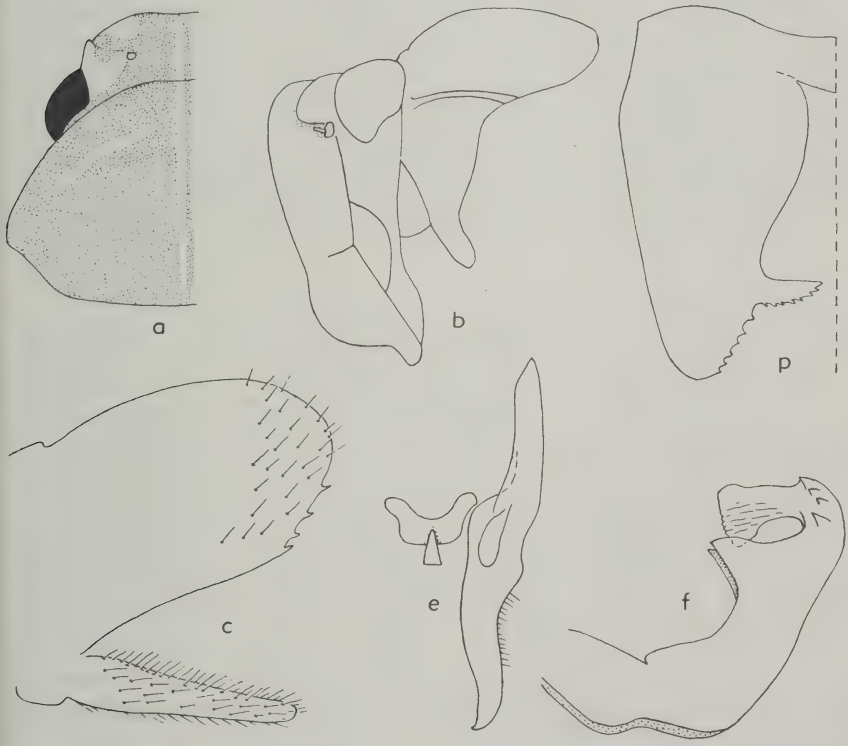


FIGURE 261.—*Backhoffella pulchra* Schmidt (specimen from Chanchamayo, Peru): *p*, Male pygofer apex, right side, from ventral view.

open basally, without an anteapical plexus of veins, with supernumerary anteapical cross veins to costal margin, texture coriaceous, without sculpturing. Female unknown. Hindwing with vein R_{2+3} entire. Hindleg with femoral setal formula 2:0:0; tibiae scarcely flattened, macrosetae of row 1 widely separated except near apex, of row 2 widely separated and without intercalary macrosetae, first tarsomere with length about equal to combined length of second and third tarsomeres and with biseriate short setae on plantar surface.

Male genitalia: Pygofer moderately produced, with sparse microsetae on posterior third, with an anteapical undifferentially sclerotized dorsal process extending mesad, its posterior margin and posterior pygofer margin with a number of short denticulate projections. Plates triangular, separate throughout their length, gradually narrowed apically, not extending as far posteriorly as pygofer apex, each with numerous multiseriate short microsetae. Style extending much farther posteriorly than apex of connective, without preapical lobe, gradually narrowed in posterior half to acute apex which is directed slightly mesad. Connective short Y-shaped with arms widely divergent, strongly keeled. Aedeagus symmetrical, attached to base of anal tube, not articulated with connective, slender, with a pair of dorsal triangular projections near midlength, apex curved dorsally. Paraphyses absent. Female unknown.

Backhoffella is known only from the type-species which is rare in collections and known only from Peru. The genus is close to the Proconiini in its facial characters, in the complete vein R_{2+3} of the hindwing and in the microsetae on plates and pygofer. It has the cicadelline character of the hind knee attaining the posterior proepimeral margin when at rest. The male genitalia are similar in many respects to species of *Punahuana*, new genus, but *Backhoffella* is much larger and *Punahuana* has macrosetae on the male pygofer and plates.

My identification of *B. pulchra* is based on a study of the male lectotype.

50. Genus **DIEDROCEPHALA** Spinola

Figures 262-265

Diedrocephala Spinola, 1850a:57. Type-species. *Cicada variegata* Fabricius, by monotypy.

Length of male 6.2-9.5 mm, of female 7.2-7.9 mm.

Head well produced, median length of crown from eight-tenths of, to one-fourth greater than (usually from nine-tenths of, to one-fourth greater than) interocular width and from slightly less than one-half to two-thirds (usually from slightly more than one-half to two-thirds) transocular width, anterior margin narrowly rounded in dorsal view, with a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to median line than to adjacent anterior eye angle, crown concave, at least in middle of disk, with a median longitudinal fovea (exception: *D. euthemis*, n. sp.) and with faint striae at least on ocellocular area, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins rectilinear and vertical or slightly oblique; clypeus convex, not tumid, muscle impressions distinct, face

without pubescence, transclypeal suture incomplete, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk with or without transverse rugae, not pubescent; scutellum not striate behind transverse sulcus. Forewing with or without a membrane, veins not very distinct, apical margin slightly concave, with three anteapical cells of which the outermost is lenticular and not reaching the apical cells, and the middle one is open basally, without an anteapical plexus of veins, with only three apical cells of which the second is narrowed apically, wing surface without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere much greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer slightly to moderately produced, posterior margin regularly convex, with a number of macrosetae of varying length on posterior half of disk, pygofer processes absent. Plates short triangular, with uniseriate macrosetae. Style extending posteriorly farther than apex of connective, with an anteapical lobe, truncate apically. Connective with arms very short. Aedeagus symmetrical, directed ventrally or posteroventrally, slightly expanded at apex. Paraphyses asymmetrical and variable intraspecifically.

Female abdominal sternum VII with posterior margin obtusangularly emarginate. Dorsal membrane of genital chamber with or without sclerites which are usually poorly delimited when present. Ovipositor with second valvula expanded beyond basal curvature and bearing dorsal elongate quadrate primary teeth, each of which bears several secondaries, with a short minutely denticulate area on dorsal margin just before sharply rounded apex. Pygofer with a number of large macrosetae arising submarginally along apical and apicoventral margins.

The genus *Diedrocephala* is one of a generic group that includes the Melichar genera *Pachitea, Tipuana, Iragua, Microgoniella, Platygonia, Pamplona;* and the following new genera treated below: *Ladoffa, Soosiulus, Palingonalia, Pamplonoidea, Aurogonalia, Medlerola,* and *Ramosulus*. *Diedrocephala* is distinct from all of the others in this group in the venation of the forewing (fig. 262*p*).

Specimens belonging to the genus *Diedrocephala* have been studied from Honduras and southern Mexico to the Guianas, Argentina, and Bolivia. Specimens are brown or black with conspicuous white markings on the median line. The markings are quite variable in the type-species. Morphological characters have not been found to support the color differences.

The female lectotype of *Cicada variegata* Fabricius is illustrated. The male genitalia of the lectotype of *C. virginea* Fabricius are like the specimen from Honduras illustrated here, except for slight differences in the aedeagus and paraphyses, both of which are illustrated.

The lectotype of *Tettigonia elvina* Butler, a teneral male, from "St. Paul" in the Amazon region, is one of the most beautiful leafhoppers ever seen by the present writer. No additional specimens have come to hand.

I have not seen types of *Tettigonia pulcherrima* Blanchard, nor *T. typhlocyboides* Signoret.

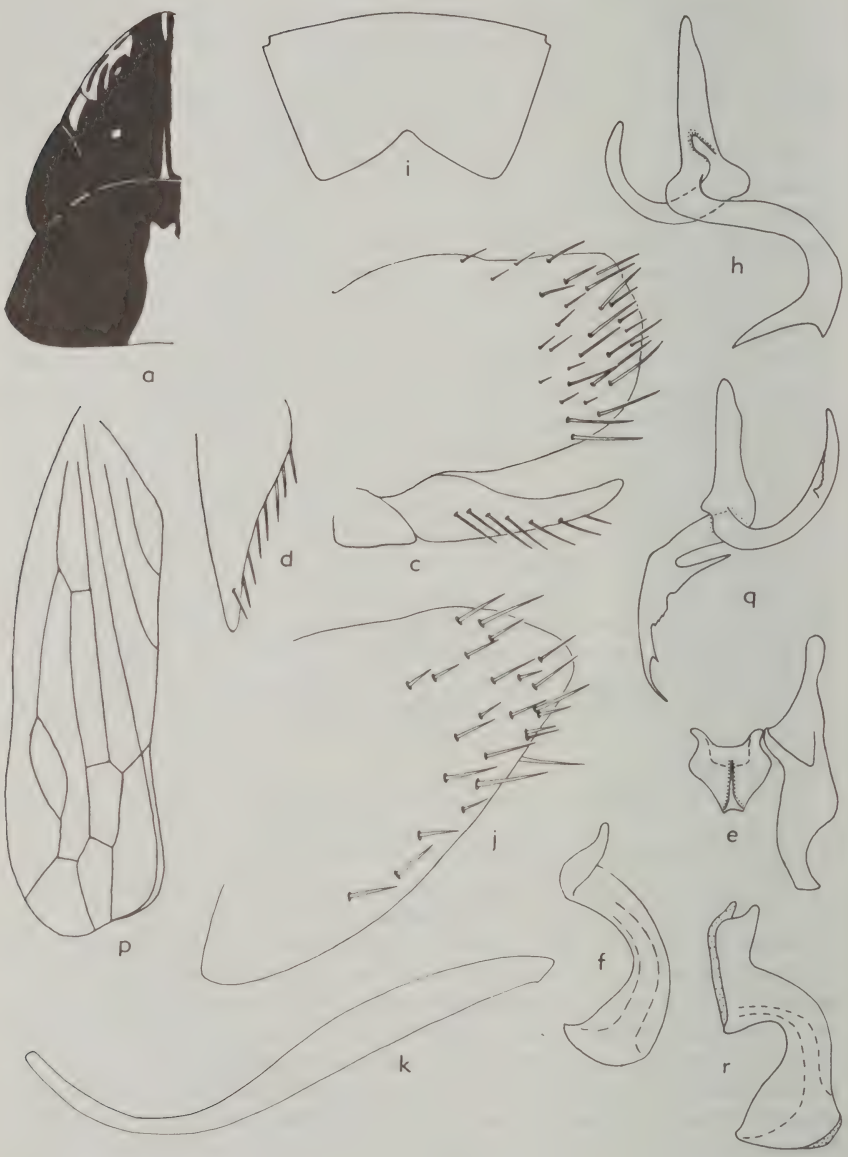


FIGURE 262.—*Diedrocephala variegata* (Fabricius) (See also fig. 263) (*a*, *i*, from lectotype; *c-f*, *h*, from specimen from Honduras; *q*, *r*, from lectotype of *Cicada virginea* (F.); *j*, *k*, from Paraná, Brazil; *h* from anterodorsal view): *p*, Forewing; *q*, paraphyses from caudal view.

DIEDROCEPHALA GENERIC GROUP

50. Diedrocephala
51. Pachitea
52. Tipuana
53. Ladoffa
54. Soosiulus
55. Iragua
56. Microgoniella
57. Platygonia
58. Palingonalia
59. Pamplonoidea
60. Pamplona
61. Aurogonalia
62. Medlerola
63. Ramosulus

SPECIES OF *DIEDROCEPHALA*

elvina (Butler), 1874e:673 (*Tettigonia*). "Amazonas."
erupa, n. sp. Peru.
euthemis, n. sp. Bolivia.
pulcherrima (Blanchard), 1840a:192 (*Tettigonia*).
typhlocyboides (Signoret), 1854d:725 (*Tettigonia*).
variegata (Fabricius), 1775a:684 (*Cicada*). S. Mexico, Honduras, El Salvador, Costa Rica, Panama, Colombia, Venezuela, Br., D., and Fr. Guiana; E., S., SE., and W. Brazil; Paraguay, Argentina, Peru, Bolivia.
virginea (Fabricius), 1803a:66 (*Cicada*).

KEY TO SPECIES OF *DIEDROCEPHALA*

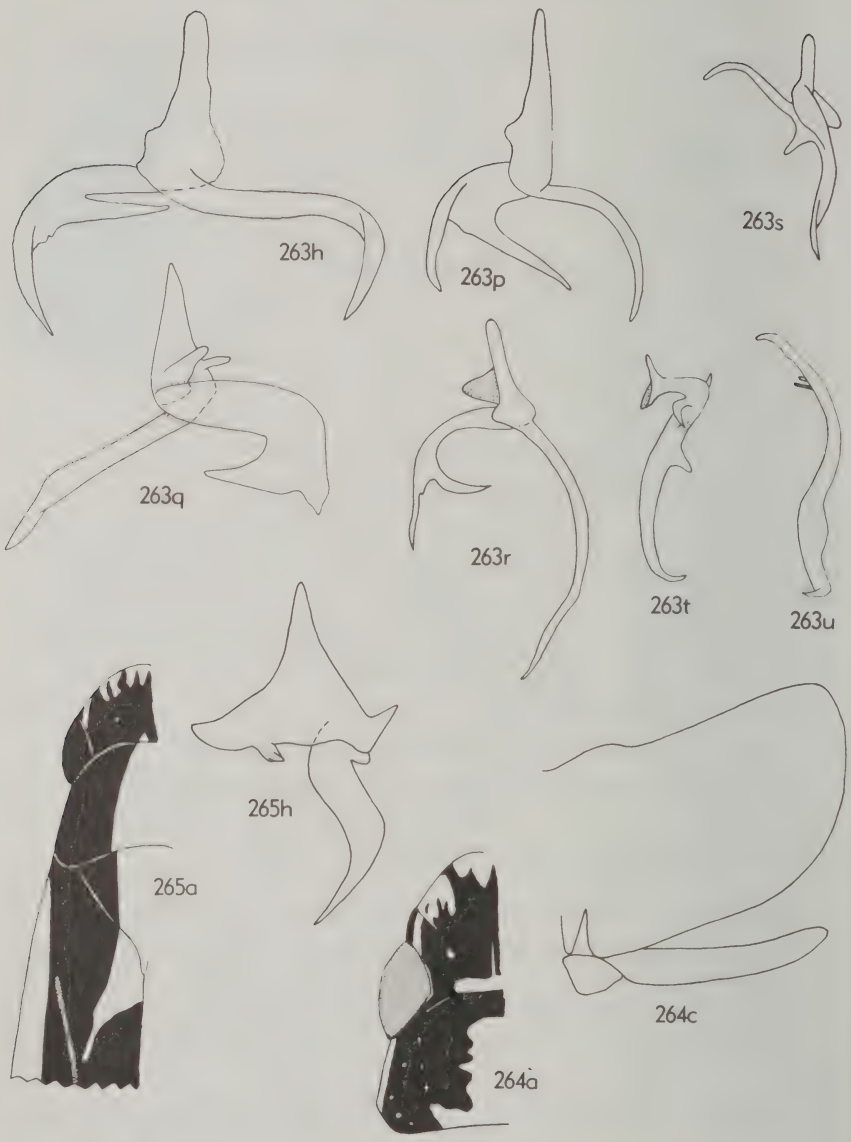
(*elvina* (Butler), *pulcherrima* (Blanchard), and *typhlocyboides* (Signoret) not included)

1. Length of female 9.5 mm; crown without a median fovea ..... *euthemis,* n. sp.
   Length of female less than 9.0 mm; crown with a median fovea 2
2. Dorsum with a median pale stripe extending from posterior pronotal margin to claval apex ..... *erupa,* n. sp., page 327
   Dorsum with median pale stripe, if present, not extending posteriorly to claval apex ..... *variegata* (Fabricius) (figs. 262, 263)

Diedrocephala euthemis, NEW SPECIES

FIGURE 265

Length of male 9.5 mm. Head with median length of crown slightly more than eight-tenths interocular width and slightly less than one-half transocular width, disk of crown without a median fovea, antennal ledges in lateral view each with anterior margin rectilinear and vertical. Pronotum without sculpturing. Other external structural characters as in generic description. Male genitalia much as in present illustration of specimen of *D. variegata* (Fabricius)



FIGURES 263-265.—263, *Diedrocephala variegata* (F.), (see also fig. 262) variations in paraphyses (*h* from specimen from Miranda, Venezuela, *p* from Callanga, Peru; *q* from Misiones, Argentina; *r* from Colombia; *s* from Sta. Catharina, Brazil; *t* from Rio Caraguata, Brazil; *u* from Santa Fé, Argentina). 264, *D. erupa*, n. sp., holotype (setae not shown in *c*). 265, *D. euthemis*, n. sp., holotype.

from Honduras (fig. 262*c-f,h*), but with basal portion of paraphyses greatly expanded at origin of rami.

Color of crown, pronotum, and scutellum deep black, of forewings brownish black, with a series of triangular markings along anterior margin of crown, a diagonal line over each ocellocular area, a hastate marking with its apex near posterior margin of crown and its base in basal half of clavus (wings at rest), an oval transcommissural marking in apical half of clavus, and a broad costal area which widens posteriorly, yellow, the last crossed by three diagonal and one transverse dark markings, a narrow oval yellow marking in corium near apex of claval suture, a narrow red line beginning in basal half of clavus and extending along its margin, crossing claval suture and extending posteriorly to point opposite base of oval yellow marking described above, a diagonal short linear red marking laterad of apical portion of preceding red line and extending apically slightly beyond it, with an irregular red blotch in apical portions of inner two anteapical cells, a narrow, transverse, slightly oblique red stripe extending from outer margin of second anteapical cell, gray; face, venter, legs, and thoracic pleura, yellow, except a longitudinal black stripe on proepimeron bordering dorsopleural carina.

Holotype male, Coroico, Bolivia (D. M. DeLong collection, OSU).

D. euthemis, n. sp., can be separated from the other species of the genus by its much larger size, by the expanded paraphyses, and by the lack of a median coronal fovea. The form of the paraphyses is suggestive of a derivation from symmetrical paraphyses.

Diedrocephala erupa, NEW SPECIES

FIGURE 264

Length of male 7.8 mm, of female 7.8-8.4 mm. Head with median length of crown equal to or slightly greater than interocular width and from almost six-tenths to less than seven-tenths transocular width, disk of crown with a distinct median fovea; antennal ledges, in lateral view, each with anterior margin very slightly convex and almost vertical. Pronotum with disk transversely rugose. Other external characters and female genital structures as in generic description. Male genitalia much as in present illustration of *D. variegata* (Fabricius) from Honduras (fig. 262*c-f, h*), but with paraphyses more like specimen illustrated from Callanga, Peru (fig. 263*p*), with posteroventral pygofer margin less convex (fig. 264*c*) and without an apicoventral aedeagal angle.

Ground color of crown and pronotum black, crown with three vittae at apex, a vitta before each lateral clypeal suture, a narrow diagonal stripe on each ocellocular area, a transverse marking along hind margin and a connected much narrower median line, yellow; pronotum with median area broadly and a number of small discal spots, yellow, the yellow of the median area shining through the transparent disk; scutellum and forewings pale ivory to yellow, basal angles of scutellum, a broad longitudinal stripe on forewing from humeral margin across basal three-fourths of clavus, extending thence diagonally to base of inner apical cells, its corial portion bearing two slender

elongate pale markings, wing apex and two diagonal markings extending from it anterolaterally to intersect costal margin, black; a transverse slightly oblique red marking extending to clavus in apical one-fifth of forewing; face, venter, thoracic pleura, and legs as in *D. euthemis*, n. sp.

Holotype male, two additional males, two females, and one specimen without abdomen, "Sinchono" Peru (D. M. DeLong collection, OSU). Six specimens of both sexes. Tingo María and 10 mi. SW of Las Palmas, Huánuco Prov., Peru (CAS).

D. erupa, n. sp., is closely related to *variegata* (Fabricius), from which it may be separated by the characters in the key and in the above description. It should be noted that the lack of an angle at the ventral portion of the aedeagal apex is not a good specific character in this genus, but the shape of the male pygofer, which differs from *variegata*, is very constant in the specimens studied thus far.

51. Genus PACHITEA Melichar

Figures 266-269

Pachitea Melichar, 1926a: 344. Type-species: *Tettigoniella habenula* Jacobi, by subsequent designation of China, 1938d: 184.

Length 8.0-10.7 mm.

Head well produced, with median length of crown usually varying from eight-tenths of to almost one-fifth greater than interocular width and from one-half to slightly more than eight-tenths transocular width, anterior margin moderately rounded in dorsal view, with a carina at transition from crown to face at apex, ocelli located behind a line between anterior eye angles, each closer to median line than to adjacent anterior eye angle, crown concave, without a median longitudinal fovea, with oblique striae parallel to margins of antennal ledges, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins strongly oblique and convex; clypeus convex, not tumid, muscle impressions distinct or not, face without pubescence, transclypeal suture usually incomplete, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width varying (interspecifically) from less than to greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk without transverse rugae, not pubescent; scutellum not rugose behind transverse sulcus. Forewing without a distinct membrane, with apical portion less opaque than remainder, but not abruptly delimited, veins not very distinct, with four apical cells and with base of fourth more proximal than base of third, without an anteapical plexus of veins, outer anteapical cell not spindle-shaped, reaching third apical cell, texture coriaceous except apically, without sculpturing; apical margin oblique to slightly concave; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere much greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, posterior margin regularly convex, with a number of macrosetae of almost uniform length on posterior half of disk. Plates slender, triangular, not extending nearly as far posteriorly as pygofer apex, with uniseriate macrosetae. Style extending posteriorly as far as or farther than apex of connective, not truncate apically. Connective variable interspecifically. Aedeagus symmetrical, directed posterodorsally, expanded or not apically. Paraphyses asymmetrical.

Female abdominal sternum VII with posterior margin well produced and narrowly rounded apically, or extremely strongly produced posteriorly in a slender tapering process that extends as far as apex of ovipositor. Dorsal membrane of genital chamber partly sclerotized. Ovipositor with second valvulae each expanded beyond basal curvature and bearing dorsal teeth which are rounded at base of toothed portion, sloping and quadrate in remainder of length of row and bearing minute secondary denticles, with a short dorsal anteapical denticulate area and with apicoventral margin denticulate, apex bluntly rounded. Pygofer with a number of irregularly arranged macrosetae at apex and near posteroventral margin.

Specimens are black with median markings often present on the forewings in rest position.

Specimens belonging to *Pachitea* Melichar have been studied from Venezuela, Colombia, Ecuador, Peru, and Bolivia. *Pachitea* has species which are similar in appearance to species of *Diedrocephala* Spinola. The males can be readily separated from those of *Diedrocephala* in the form of the aedeagus which is directed posterodorsally, instead of ventrally or posteroventrally as in *Diedrocephala*. In the female, abdominal sternum VII has the posterior margin emarginate in *Diedrocephala,* produced in *Pachitea*. *Pachitea* is also similar to *Microgoniella* Melichar in a number of characters, for example the general appearance, the produced female seventh abdominal sternum, and the shape of the apex of the second valvulae of the ovipositor. But the asymmetrical paraphyses of the male (rarely present, and then reduced and symmetrical in *Microgoniella*), the more produced seventh sternum of the female and the larger size of *Pachitea* species distinguish *Pachitea* from *Microgoniella*.

The present interpretation of *Tettigoniella habenula* Jacobi is based on a study of the lectotype and on a male agreeing in color with it. The holotype female of *Tettigonia subflava* Walker was studied, but I have not compared males with it directly. The females of the male illustrated here (fig. 266) agree with Walker's holotype, and I know of no species in Venezuela other than the one illustrated.

A specimen of *P. subflava* (Walker) from Santander, Colombia in the USNM was collected on coffee.

SPECIES OF *PACHITEA*

habenula (Jacobi), 1905c:183 (*Tettigoniella*). Peru.
jezima, n. sp. Peru.
ryma, n. sp. Ecuador, Peru, Bolivia.
subflava (Walker), 1851b:762 (*Tettigonia*). Venezuela, Colombia. New combination.

FIGURES 266, 267.—266, *Pachitea habenula* (Jacobi) (*i* from lectotype; remainder from specimen from Callanga, Peru; *h* from ventral view). 267, *P. subflava* (Walker) (from specimens from Colombia; *h* from lateral view): *p*, Forewing; *q*, teeth at base of second valvula of ovipositor.

KEY TO MALES OF *PACHITEA*

1. Styles very much exceeding apex of connective which is very short, without distinct preapical lobes (fig. 268*e*) ..... *ryma*, n. sp.
   Styles not, or only slightly exceeding apex of connective and with distinct preapical lobes 2

2. Connective very short, its stem as long as its arms, apical portion of aedeagus in lateral view with dorsal margin abruptly expanded (fig. 267*f*) *subflava* (Walker) (fig. 267)
   Connective longer, its stem longer than its arms, apical portion of aedeagus in lateral view with dorsal margin not abruptly expanded (figs. 266*f* and 269*f*) 3

3. Shoulder of male plate narrower (fig. 269*d*); connective extending posteriorly beyond apex of style; apical lobe of aedeagus longer *jezima*, n. sp., page 333
   Shoulder of male plate broader (fig. 266*d*), connective not extending posteriorly beyond apex of style; apical lobe of aedeagus shorter *habenula* (Jacobi) (fig. 266)

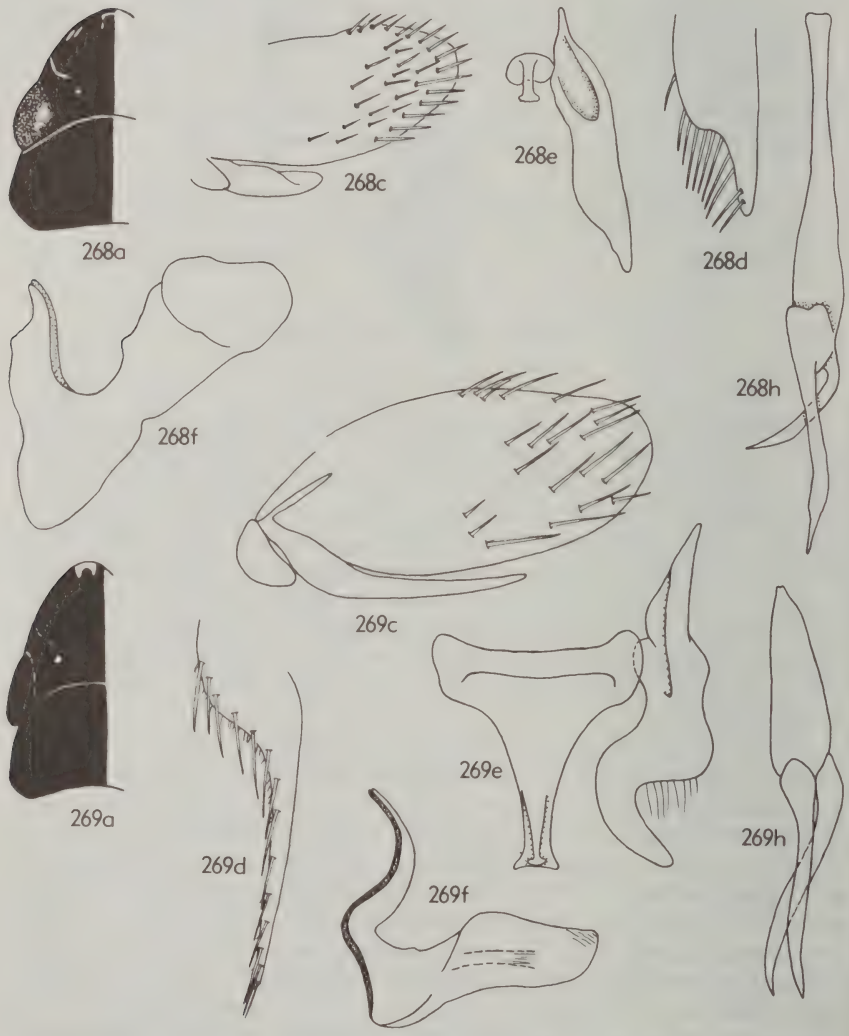
Pachitea ryma, NEW SPECIES

FIGURE 268

Length of male 9.7-10.1 mm. Head with median length of crown varying from one-tenth less than to slightly greater than interocular width, and from slightly more than one-half to six-tenths transocular width; clypeus with muscle impressions not or not very distinct, transclypeal suture obsolete medially. Pronotal width slightly less than transocular width of head. Male plates narrowed at midlength; style extending posteriorly much farther than apex of connective, very broad in basal two-thirds, gradually tapered in apical one-third which is not curved and is without preapical lobe; connective very short, T-shaped; aedeagus with apical lobe shorter than in *P. habenula* (Jacobi) and oblique at apex; paraphyses with stalk much longer than the pair of rami. Female unknown.

Color of dorsum black to dark brown with markings on forewing dull red (type) or pale yellow, always with an oblique marking extending inward from costal margin opposite claval apex on each wing and a smaller marking bordering costal margin opposite base of outer apical cell; forewings in rest position with median markings varying in color and shape, from dull red (type) to pale or dull yellow, in some specimens (type) with a semi-elliptical transcommissural spot near base of clavus and a wider spot at claval apex extending into corium of each wing, in other specimens with median markings consisting of a narrow pale yellow longitudinal commissural stripe on each wing from yellow tip of scutellum to claval apex, and in some of these with the longitudinal stripe interrupted before the claval apex, and with intergrading patterns in some specimens; face, thoracic, and abdominal venter, lower portions of thoracic pleura, and legs, pale yellow, apical posterior tarsomeres black in their apical portions; male plates and pygofer black.

Holotype male and two additional males, Callanga, Peru; one male, Ecuador (USNM). One male, Mojos, Bolivia (N. Holmgren) and one male, Coroico, Bolivia (RMS). Five males, Coroico, Bolivia (OSU). Two males, Colonia Perené, Rio Perené, 18 miles northeast of La Merced, Junín Province, Peru, January 3, 1955 (E. I. Schlinger and E. S. Ross) (CAS). One male, Mapiri, Bolivia, bearing a Melichar manuscript name (MMB).



FIGURES 268, 269.—268, *Pachitea ryma*, n. sp., holotype (*h* from lateral view). 269, *P. jezima*, n. sp., holotype (*h* from dorsal view).

P. ryma, n. sp., may be distinguished quickly from other species in the genus by the distinctive form of the styles and connective, and externally by the male plates, which begin to narrow farther from their bases than in other species of the genus.

Pachitea jezima, NEW SPECIES

FIGURE 269

Length of male 9.7-10.1 mm, of female 10.4-10.7 mm. Head with median length of crown varying from very slightly less than interocular width to almost one-fifth greater than interocular width; length from two-thirds to slightly more than seven-tenths transocular width; clypellus with muscle impressions distinct, transclypeal suture obsolete medially. Pronotal width equal to transocular width of head. Male plates narrowed before midlength; style extending posteriorly as far as apex of connective, with a strong preapical lobe and with apical one-third strongly curved; connective much longer and markedly larger than in *P. ryma*, n. sp., much as in *P. habenula* (Jacobi); aedeagus with apical lobe longer than in other species in genus; paraphyses with stalk not longer than the pair of rami. Female abdominal sternum VII with median produced portion longer and more slender than in *subflava* (Walker) (fig. 267*i*) but not nearly as strongly produced as in *habenula* (Jacobi) (fig. 266*i*).

Color of dorsum including forewings black with markings ivory to yellowish-ivory, with the pair of costal anteapical markings present as in *ryma* (above) and as in other species of the genus, but closer together, being separated from each other by a space less than the width of the more anterior pale marking, remainder of forewing black and unmarked or with transcommissural ivory markings in basal half and at apex of clavus, the former not extending laterally beyond claval suture, the latter extending slightly into corium, face and venter as in *ryma*.

Holotype male and one additional male, Huallaga River Valley, 500 m. above sea level, Huánuco (province), Peru, March 1954 (F. L. Woytkowski) (NCS). Three males and one female, Monsón Valley, Tingo María, Peru, September 23, 1954 (E. I. Schlinger and E. S. Ross); one female, same data as preceding except date which is October 8, 1954 (CAS). One female, Tingo María, September 10, 1944 (E. J. Hambleton); one male and two females, Tingo María, Huánuco Province, June 23, 1962 (W. T. Van Velsen) (USNM). One male, Madre de Dios, S. O. [southeast] Peru, "187" (ZIL). Holotype on indefinite loan to USNM.

P. jezima, n. sp., is more closely related to the type-species, *P. habenula* (Jacobi) than to other species in the genus. Externally, *jezima* can be separated from *habenula* and *ryma* by the narrowness of the dark area that separates its two anteapical costal markings on each forewing. In *habenula* and *ryma* the space is wider than the more anterior of the markings. The female of *jezima* has the abdominal sternum VII much less strongly produced than in *habenula*. The shape of the aedeagus of *jezima* (fig. 269*f*) differs slightly from that of *habenula*.

52. Genus TIPUANA Melichar

Figures 270-274

Type-species: *Tipuana expallida,* new species.

Length 7.6-10.4 mm.

Head moderately to well produced, median length of crown varying from six-tenths of, to one-tenth greater than interocular width, and from slightly less than four-tenths to six-tenths transocular width, anterior margin varying interspecifically from narrowly to broadly rounded in dorsal view, ocelli located behind a line between anterior eye angles, variable with relation to relative distance from median line of crown and adjacent anterior eye angle, crown shallowly concave, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not or only slightly protuberant, in lateral view with anterior margins varying from convex to rectilinear; clypeus usually flattened (convex in *T. albula* (Osborn)), muscle impressions distinct (*albula*) or not, face without pubescence, transclypeal suture incomplete, clypellus not produced, contour of its lower portion usually more nearly horizontal than remainder of face (exception: *albula*).

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk without transverse rugae, not pubescent; scutellum not transversely striate behind transverse sulcus. Forewing without a membrane, veins usually indistinct at base of anteapical cells, apex of outermost anteapical cell attaining base of outer apical cell, with four apical cells of which second is narrowed apically and fourth with its base more proximal than base of third; texture opaque or translucent, without sculpturing, apical margin slightly concave; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin varying from narrowly to broadly convex, setae variable in size, located on posterior half, pygofer processes absent. Style extending posteriorly beyond apex of connective, usually with preapical lobe (not extending as far as apex of connective and without a preapical lobe in an undescribed species), narrowly convex apically (exception: truncate in *T. chirensis*, n. sp.). Connective Y-shaped with arms widely divergent (exception: *chirensis*). Aedeagus symmetrical or not, with one or more apical processes and with or without a ventral process on shaft near its base. Paraphysis or paraphyses present, symmetrical or not.

Female abdominal sternum VII with posterior margin transverse, shallowly emarginate medially, the emargination bearing a short triangular process in some species. Ovipositor with second valvulae expanded throughout length beyond basal curvature, the expanded portion with numerous uniform sloping quadrate dorsal teeth, each bearing minute secondaries, with anteapical dorsal and posteroventral denticles. Pygofer slender, narrowly convex posterodorsally, with numerous macrosetae on posterior and posteroventral portions (valvulae II not illustrated, but very similar to illustration for *Pachitea* (fig. 267)).

Specimens of *Tipuana* Melichar are either very pale with longitudinal brown stripes over crown and pronotum and oblique dark stripes on corium opposite claval apex, or black dorsally (*T. albula* (Osborn) and two similarly-colored forms not described here) with pale spots of several sizes and shapes. In these dark forms, a transcommissural pale translucent spot in the clavus is conspicuous because, with the wings at rest, it occurs above a larger transparent spot in the folded hindwings. All specimens are pale beneath. I have refrained from describing these two dark forms with different male genitalia because the specimens are almost identical in other characters, because of the variability encountered in the related genus *Diedrocephala* Spinola, because of variation found within *albula* in a strict sense, and because asymmetrical apical aedeagal processes often tend to vary in the tribe. The genitalia of these two forms are illustrated in figures 273 and 274. A specimen of *albula* from San Gabriel, Brazil has an aedeagus in which the dorsal retrorse process is lacking and the ventral process near the base of the shaft is slightly different. Three males from French Guiana have genitalia like figure 274. Only the specimen illustrated, from French Guiana, had genitalia like figure 273.

The range of *Tipuana* is French Guiana, Brazil, Ecuador, and Peru. *Tipuana* is related to *Diedrocephala* Spinola from which it differs in the presence of four apical cells in the forewing, and in that the outer anteapical cell reaches the base of the apical cells. *Tipuana* is also close to *Platygonia* Melichar, in the discussion of which differences are noted.

My identification of *Diedrocephala albula* Osborn rests on a study of the paratype illustrated in figure 270.

The new species, *Tipuana expallida,* described below, is the same as Melichar's unpublished interpretation of *T. egregia*, a *nomen nudum*, cited in the literature as type-species of the genus.

SPECIES OF *TIPUANA*

albula (Osborn), 1926b:220 (*Diedrocephala*). Fr. Guiana, Brazil. New combination.
chirensis, n. sp. Peru.
expallida, n. sp. Peru.

KEY TO MALES OF *TIPUANA*

1. Forewings opaque; aedeagus with a median ventral keel in basal half
albula (Osborn) (fig. 270)
Forewings pale translucent; aedeagus not keeled 2

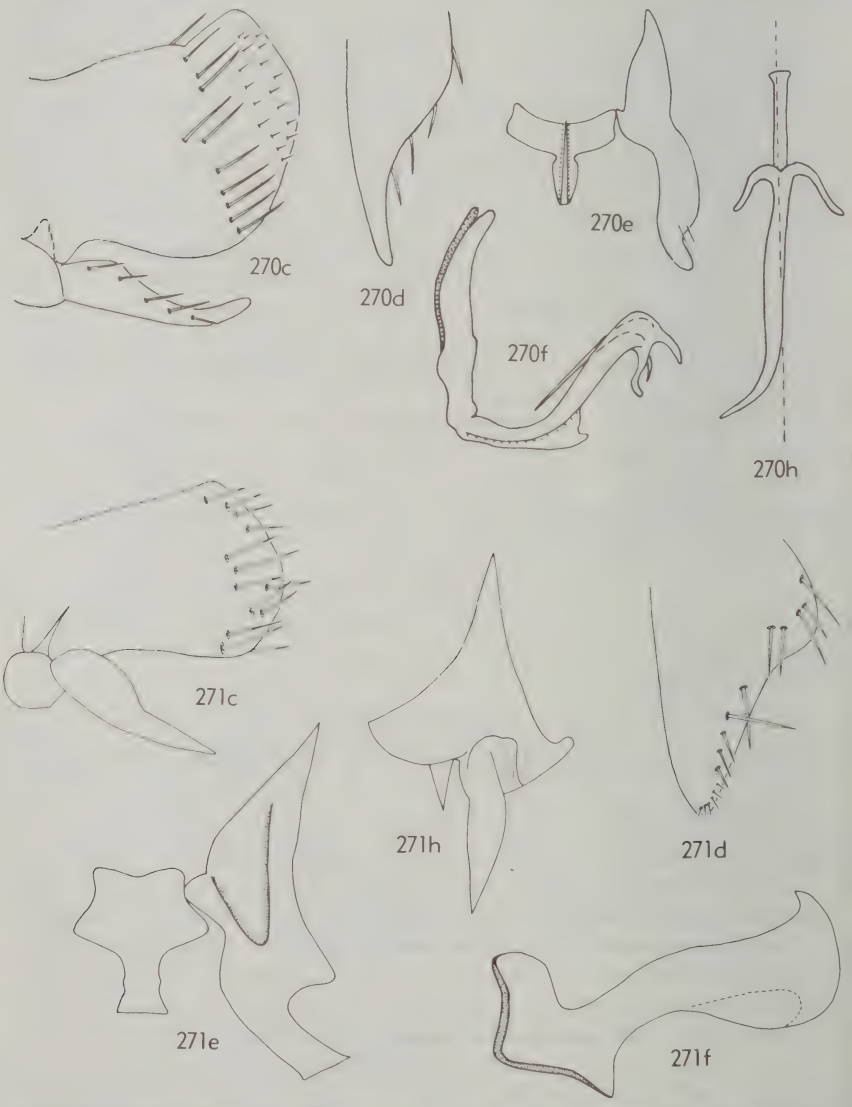
2. Styles truncate apically; aedeagus without apicoventral processes; pygofer with dorsoapical margin not truncate ..... *chirensis,* n. sp.
Styles narrowly rounded apically; aedeagus with apicoventral processes; pygofer produced and truncate dorsoapically
expallida, n. sp., page 339

Tipuana chirensis, NEW SPECIES

FIGURE 271

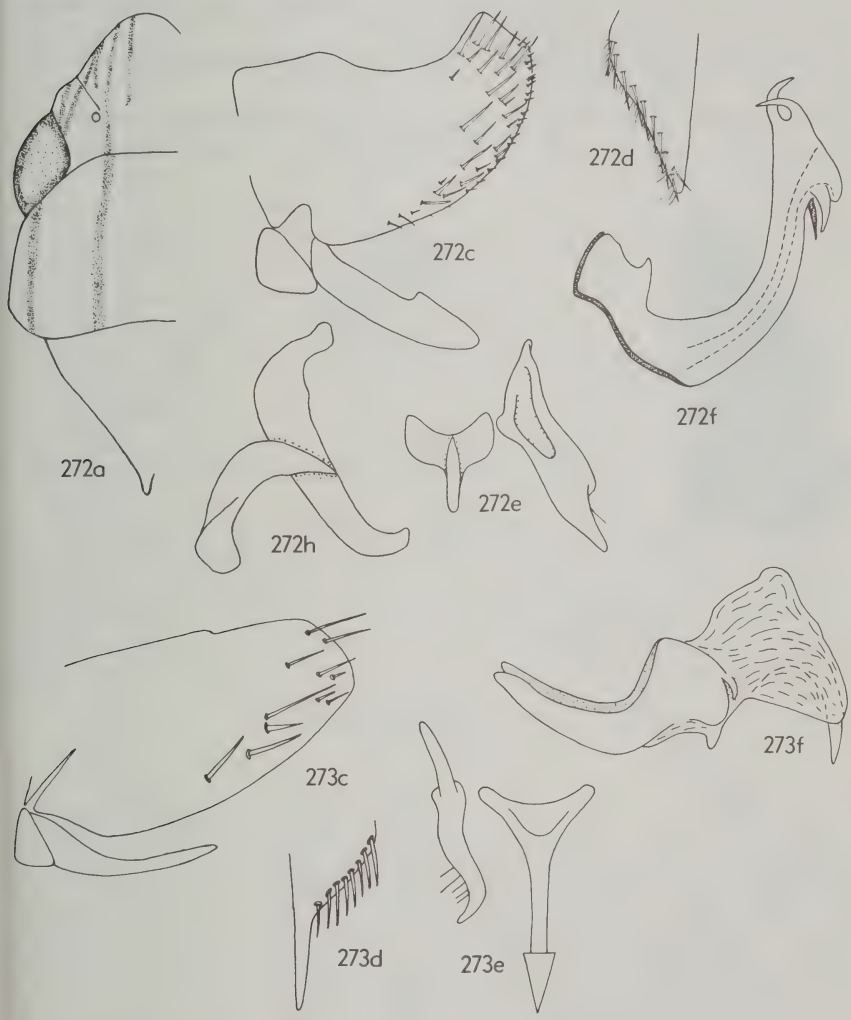
Length of male 9.1 mm, of female 10.4 mm. Head moderately produced, median length of crown varying from two-thirds to seven-tenths transocular

width, anterior margin broadly rounded in dorsal view, ocelli located behind a line between anterior eye angles, antennal ledges with anterior margins slightly convex in lateral view, clypeus with muscle impressions not distinct. Forewings translucent. Male pygofer with posterior margin broadly convex, with macrosetae near posterior margin; style with preapical lobe pronounced, apex truncate; connective with arms very broad; aedeagus symmetrical, truncate apically, with a short dorsoapical angular process; paraphyses short, with rami asymmetrical.



FIGURES 270, 271.—270, *Tipuana albula* (Osborn), paratype (*h* from caudoventral view). 271, *T. chirensis,* n. sp., holotype (*h* from caudoventral view).

Crown, pronotum, and scutellum tan, with four or six short longitudinal black lines at anterior margin of crown, a pair of longitudinal brown lines beginning behind these and extending through ocelli and posterior margin of crown, diverging over pronotum and scutellum and ending at midlength of lateral margins of scutellum, and a similar line near each lateral pronotal margin. Forewing of holotype with clavus translucent brown with a curved yellow stripe beginning at humeral margin, extending sinuously to claval



FIGURES 272, 273.—272, *Tipuana expallida*, n. sp., holotype; (*h* from ventral view). 273, *Tipuana* sp. (specimen from Maroni River, French Guiana; paraphysis shown in *e*).

suture at midlength and an oblique yellow spot in apical half of clavus extending from claval suture to commissural margin; brachial cell and adjoining cell of corium tan with dull orange stripe parallel to brachial cell and a similarly colored spot opposite claval apex; two diagonal parallel brown bands extending posteromesad from costal margin in apical half of wing, a hyaline spot in base of outer apical cell narrowly bordered anteriorly with red and posteriorly with brown; a small black spot in first and third apical cells. Female marked as in holotype except that clavus and adjoining area of corium are not brown. Face, venter, thoracic pleura, and legs, dull yellow to brown, with a dark line below dorsopleural carina.

Holotype male and one female, Chiriaco, Peru, September 25, 1968 (D. Ojeda P.) (AMNH).

Of the two pale species of *Tipuana*, *chirensis* is distinctive in its truncate style apices, shorter pygofer, and a lack of apicoventral aedeagal processes.

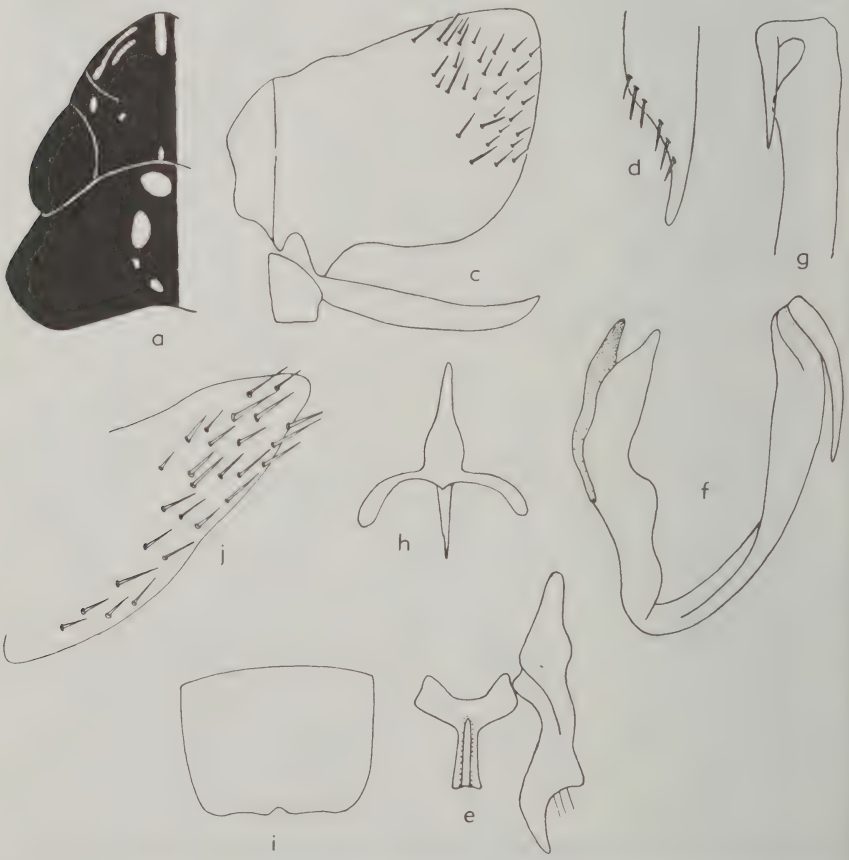


FIGURE 274.—*Tipuana* sp. (specimens from French Guiana; only apical portion of aedeagus shown in *g; h* from dorsal view).

Tipuana expallida, NEW SPECIES

FIGURE 272

Length of male 10.4 mm. Head moderately produced, median length of crown seven-tenths interocular width and one-half transocular width, anterior margin more narrowly rounded in dorsal view than *T. chirensis*. Forewings missing. Other external characters as in *chirensis*. Male pygofer produced posterodorsally and truncate, with macrosetae near posterior margin and extending anteroventrally near posteroventral margin; style with preapical lobe not as distinct as in *chirensis* and narrowly rounded at apex; connective with arms not broad; aedeagus with a pair of curved apicoventral short acute processes and a pair of dorsoapical acute curved processes that are similar to each other in form but not in symmetrical planes; paraphyses short with rami asymmetrical.

Crown, pronotum, and scutellum dull yellow, with a pair of longitudinal narrow brown lines extending full length of crown between ocelli, a pair of shorter similar parallel lines between these, an oblique similar line extending anteromedially from each eye and crossing suture before ocellus, and a very short narrow oblique black stripe near margin of antennal ledge, the longest lines of the crown continuing over pronotum to its posterior margin; pronotum also with a darker line parallel to and near lateral margin. Face, thoracic pleura, venter, and legs pale yellow with a dark line below dorsopleural carina.

Holotype male, Hacienda María, Cuzco, Peru, February 22, 1952 (F. L. Woytkowski), along Río Cosnipata, 900 m., on indefinite loan to USNM from NCS.

As noted above, *T. expallida* would have been the type-species of *Tipuana* had Melichar completed his work. The single male in HNHM agreed with the present illustration. I did not select this as type-species because the specimen at hand is without forewings. *T. expallida* is closely related to *T. chirensis* in the discussion of which distinguishing characters are treated.

53. LADOFFA, NEW GENUS

FIGURES 275-296

Type-species: *Tettigonia ignota* Walker.

Length of male 6.0-8.5 mm, of female 5.9-7.9 mm.

Head moderately produced, median length of crown from slightly more than six-tenths of, to almost one-fourth greater than interocular width, and from four-tenths to two-thirds transocular width, anterior margin narrowly rounded or subangulate in dorsal view, without a carina at transition from crown to face, ocelli slightly variable intraspecifically in location, on or slightly before a line between anterior eye angles, and each equidistant, or nearly so, from median line and adjacent anterior eye angle, crown with a median full-length longitudinal fovea, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli, antennal ledges not protuberant, in lateral view with anterior margins rectilinear and oblique;

clypeus convex or slightly flattened medially, muscle impressions distinct or not, face without pubescence, transclypeal suture usually incomplete, clypellus with contour continuing profile of clypeus.

Thorax with pronotal width equal to or slightly greater than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete, posterior margin rectilinear or (more often) slightly concave, disk without sculpturing or pubescence; scutellum not striate behind transverse sulcus. Forewing not broadened apically, with membrane not sharply delimited, veins not very distinct, apical margin slightly concave, with four apical cells, the base of the fourth more proximal than base of third, second apical cell strongly narrowed apically, without a plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor; hindwing smoky subhyaline with a splotch of contrasting color on vein m-cu. Hindleg with femoral setal formula 2:1:1, first tarsomere longer than combined length of second and third tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately to well produced, usually convex apically, but occasionally (*L. uncata*, n. sp.) truncate, or with an apical acute undifferentially-sclerotized portion (*L. yusti*, n. sp.), or with processes arising variously, with a number of macrosetae which are variable interspecifically in arrangement, in some species with interspersed microsetae, occasionally also with a basiventral group of microsetae. Plates triangular, usually not extending posteriorly nearly as far as pygofer apex, each with a longitudinal row of macrosetae. Style extending posteriorly to an extent which varies interspecifically, with or without a preapical lobe. Connective Y-, T-shaped, or trapezoidal. Aedeagus symmetrical, with or without processes. Paraphyses present (exception: *L. rubriguttata* (Walker)), symmetrical, and usually stalked.

Female abdominal sternum VII moderately produced medially and with apex narrowly notched medially. Genital chamber without sclerites. Ovipositor with second valvulae each with dorsal teeth on most of portion beyond basal curvature, the primary teeth quadrate, bearing minute secondary denticles and extending to apex which is bluntly rounded; posteroventral margin with minute denticles. Pygofer with a number of macrosetae, usually more numerous near posterodorsal and posteroventral margins.

Specimens of *Ladoffa*, new genus, are usually colored red and black in dorsal view, but the ground color of the crown and pronotum may be brown. The forewings are most often black marked with red, or less commonly red marked with black. Some of the markings are constant intraspecifically and of use taxonomically, for example the form of middle red marking of the clavus in a number of species.

The genus is named in honor of Sonia Ladoff, teacher of biology in the Pittsburgh, Pennsylvania public school system, whose enthusiasm for insects led me to an interesting and beloved hobby which later became a profession which led eventually to the present endeavor.

Ladoffa is related to *Iragua* Melichar in the treatment of which distinguishing characters are discussed. It is also related to *Diedrocephala* Spinola from which it differs in having four apical cells in the forewing, in lacking a

carina at transition from crown to face, in its symmetrical paraphyses in the male (asymmetrical in *Diedrocephala*) and in the produced sternum VII of the female (concave in *Diedrocephala*).

Specimens belonging to *Ladoffa* have been seen from southern Mexico to Bolivia and southeastern Brazil and Argentina. Little is known of the biology of the species, but *L. dependens,* n. sp., has been collected on cacao in Guatemala and intercepted from a banana cargo from Guatemala. *L. sannionis,* n. sp. and *L. elauta,* n. sp., have both been collected on cacao, in Guatemala and Costa Rica respectively, and the former also on sweet lemon in Costa Rica.

There are three female specimens of *Tettigonia coccinea* Fowler in the British Museum. I have identified a male (fig. 294) from a specimen compared with two of these.

Only two specimens of *Tettigonia guttata* Signoret have been seen; the lectotype, which is without an abdomen, and a molded specimen with abdomen and wings missing. It is possible that one of the new species, below, should bear the Signoret name, but none of them seem to agree well with the original illustration, as did the lectotype.

There are nomenclatural difficulties relating to *Cicada sanguinolenta* Coquebert. I overlooked Fabricius' (1803a:67) reference to Coquebert's earlier work while working with the Fabrician types in Copenhagen, and in the belief that Fabricius was proposing a new species, I selected a lectotype of *Cicada sanguinolenta* Fabricius (Young 1965c:16). But the "lectotype", which fits Fabricius' description, and which I sketched, apparently does not fit the original description (the original illustration is of no value as far as species identification is concerned) of Coquebert, but agrees with specimens I studied subsequently from British Guiana, and which are conspecific with the holotype of *Tettigonia ignota* Walker, which is the oldest available name, since *Cicada sanguinolenta* is preoccupied (in Cercopidae). The Coquebert *sanguinolenta* is not renamed here, because its identity is unknown and likely to remain so. Dr. Metcalf (1965a:405) used *rubriguttata* Walker as the oldest available name for the species treated here as *ignota* (Walker), but a female specimen which I compared with the lectotype of *rubriguttata* belongs to another species, which is keyed and illustrated below.

The present interpretation of *Tettigonia purpurascens* Fowler is based on specimens which agree well with the original illustration of that species.

SPECIES OF *LADOFFA*

*(*No specimens seen; **known only from specimens without abdomen)*

arcuata, n. sp. Guatemala, Nicaragua, Costa Rica, Panama.
cavillator, n. sp. S. Mexico, Guatemala, Honduras.
coccinea (Fowler), 1900a:263 (*Tettigonia*). Mexico. New combination.
comitis, n. sp. Fr. Guiana, Br. Guiana, W. Brazil.
dependens, n. sp. S. Mexico, Honduras, Guatemala, Costa Rica.
donsana, n. sp. Costa Rica, Ecuador.
elauta, n. sp. Costa Rica.
enochra, n. sp. SE. Brazil, Argentina.
***guttata* (Signoret), 1854b:355 (*Tettigonia*). Mexico. New combination.

ignota (Walker), 1851b:766 (*Tettigonia*). Costa Rica, Panama, Colombia, Gorgona Is., Br. Guiana. New combination

sanguinolenta (Fabricius not Coquebert), 1803a:67 (*Cicada*), misdetermination.

insperata, n. sp. NW. Brazil.

lentiginosa, n. sp. S. Mexico, Guatemala, Costa Rica.

miara, n. sp. Costa Rica.

nozama, n. sp. NE. and NW. Brazil.

obscurana, n. sp. Ecuador, Peru, Bolivia, N. and W. Brazil.

paraensis, n. sp. Brazil.

purpurascens (Fowler), 1900a:259 (*Tettigonia*). S. Mexico. New combination.

rubriguttata (Walker), 1851b:763 (*Tettigonia*). Costa Rica, Panama, Gorgona Island. New combination.

**sanguinolenta* (Coquebert), 1801a:79 (*Cicada*) (preoccupied).

sannionis, n. sp. S. Mexico, Guatemala, Honduras, El Salvador, Costa Rica, Panama Colombia, Ecuador, Venezuela, Br. & D. Guiana.

scopigera, n. sp. Peru.

uncata, n. sp. Panama, Colombia.

variolaria, n. sp. Costa Rica, Panama.

yusti, n. sp. Ecuador.

KEY TO MALES OF *LADOFFA*

(Not included: *guttata* (Signoret) and *sanguinolenta* (Coquebert))

1. Crown and pronotum with a median black stripe ..... *coccinea* (Fowler) (fig. 294)
   Crown and pronotum not so marked 2

2. Pygofer process arising basiventrally ..... *rubriguttata* (Walker) (fig. 296)
   Pygofer processes usually absent, when present arising on apical, dorsoapical, or ventroapical margin, or more distally on caudoventral margin 3

3. Aedeagus without processes 4
   Aedeagus with one or more processes 10

4. Pygofer in lateral view with an apical process or projection 5
   Pygofer in lateral view not as above 6

5. Paraphysis not forked; ventroapical pygofer margin sclerotized ..... *yusti,* n. sp., page 344
   Paraphyses forked; ventroapical pygofer margin membranous ..... *donsana,* n. sp., page 346

6. Crown with median line black; forewing with black markings attaining costal margin in several places ..... *cavillator,* n. sp., page 366
   Crown with median line pale; forewing with black markings attaining costal margin in no more than one place 7

7. Paraphyses with rami reduced to short apical lobes (fig. 280*h*) with which aedeagus is articulated ..... *paraensis,* n. sp., page 349
   Paraphyses with slender comparatively elongate rami, aedeagus not articulated with their apices 8

8. Paraphyses with stalk longer than rami; aedeagal shaft usually with an anteapical convexity on ventral margin in lateral view
comitis, n. sp., page 348
Paraphyses with stalk shorter than rami; aedeagal shaft without a convexity on ventral margin in lateral view 9

9. Paraphyses curved dorsally at apices ..... *insperata,* n. sp., page 346
Paraphyses curved ventrally at apices ..... *nozama,* n. sp., page 351

10. Paraphyses with rami abruptly curved mesally and crossing median line apically ..... *miara,* n. sp., page 351
Paraphyses with rami usually not abruptly curved, not crossing median line apically 11

11. Pygofer in ventral view with a close-set group of mesal anteapical macrosetae 12
Pygofer without such a group of setae 13

12. Aedeagus with basiventral processes not stalked, strongly decurved apically (fig. 284*f*) ..... *scopigera,* n. sp., page 354
Aedeagus with basiventral processes long-stalked, the rami separating apically and only very slightly decurved (fig. 283*f, r*)
enochra, n. sp., page 352

13. Pygofer with pair of apicoventral processes, each crossing median line
uncata, n. sp., page 365
Pygofer without such processes (anteapical ventral processes may be present) 14

14. Aedeagus with an unpaired elongate ventrally-directed process arising near base of ventral margin (with or without an additional process or processes) 15
Aedeagus without such a process (with or without other processes) ... 18

15. Pronotum dark, marked with two median and two lateral spots
elauta, n. sp., page 358
Pronotum with longitudinal red markings, or entirely dark 16

16. Aedeagus with one or more processes on ventral margin of shaft in addition to basiventral process ..... *ignota* (Walker) (fig. 275)
Aedeagus without processes on ventral margin of shaft in addition to basiventral process 17

17. Aedeagus with basiventral process usually bearing one or two short protuberances on its posterior margin near midlength; forewings at rest with posterior claval red spots not surrounding a transcommissural black spot ..... *dependens,* n. sp., page 361
Aedeagus with basiventral process without a protuberance and forewings at rest with posterior claval red spots surrounding a transcommissural black spot ..... *arcuata,* n. sp., page 362

18. Paraphyses abruptly narrowed apically and strongly recurved
variolaria, n. sp., page 365
Paraphyses not recurved apically 19

19. Aedeagus with paired basiventral processes; pygofer with a ventral process arising on each side much before apex, the processes crossing the median line ..... *obscurana,* n. sp., page 356
With neither of the above characters 20

20. Forewings appearing red, marked with black; crown with red markings not extending to apex ..... *purpurascens* (Fowler) (fig.295)
Forewings appearing black, marked with red; crown with red markings extending to apex 21

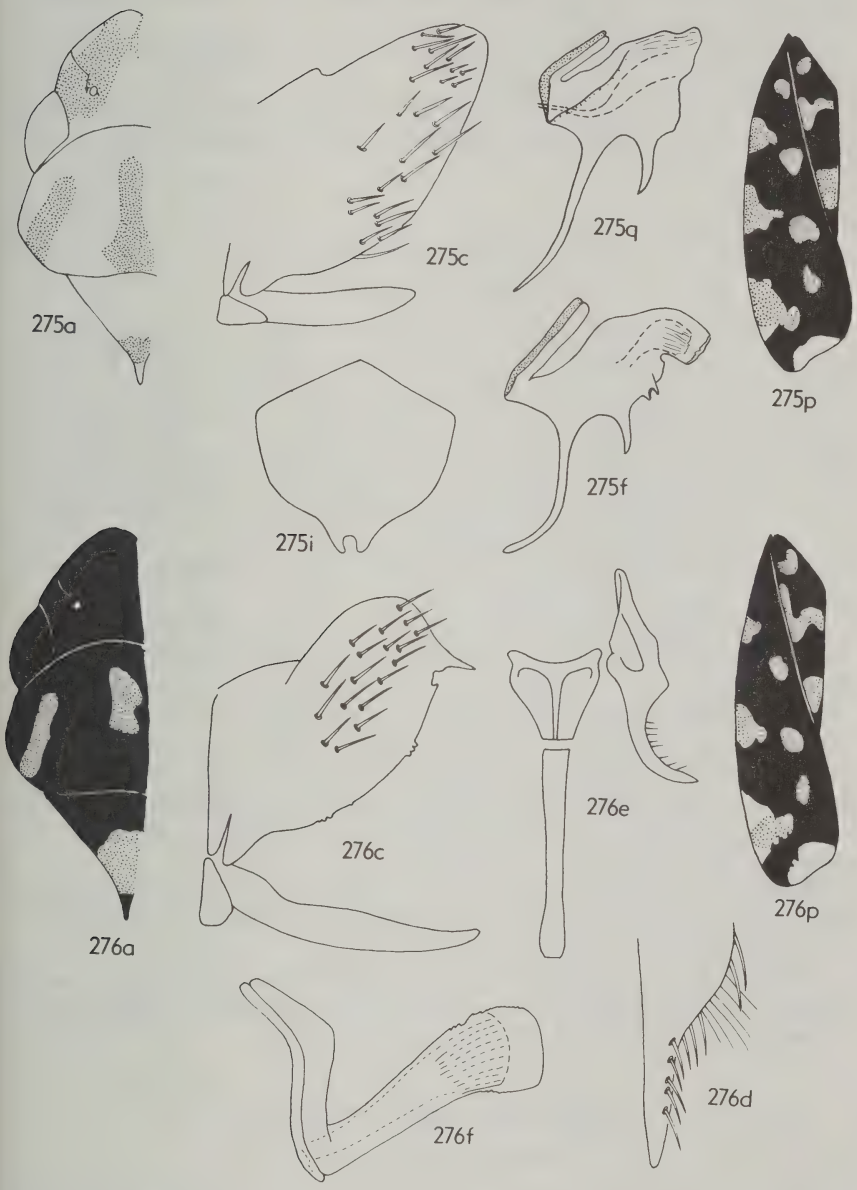
21. Forewing with midclaval red spot extending basad along claval suture; aedeagal apex bifid dorsally and with an elongate slender ventral process ..... *sannionis,* n. sp., page 357
Forewing with midclaval red spot not extending basally; aedeagal apex angulate ventroapically, but not as above
lentiginosa, n. sp., page 360

Ladoffa yusti, NEW SPECIES

FIGURE 276, PAGE 345

Length of male 7.3 mm. Head with median length of crown from slightly less than three-fourths to almost eight-tenths interocular width and slightly less than one-half transocular width; clypeus convex medially, muscle impressions distinct. Male pygofer moderately produced, apical margin with a short triangular undifferentially-sclerotized process, with a few macrosetae near middle of posterior half of disk, without interspersed microsetae; plates extending posteriorly as far as pygofer apex, style extending posteriorly beyond apex of connective which is subtrapezoidal; aedeagus without processes, shaft scarcely decurved apically; paraphysis occurring as a median longitudinal unbranched bar.

Ground color of dorsum black, crown unmarked; pronotum with a median longitudinal mark on disk; not attaining anterior or posterior margin and an oblique vitta on each side, not extending to anterior margin, red; scutellum with a large anteapical red spot; forewing with three prominent claval red markings, the basal one lobate, the middle a narrow transcommissural arcuate marking which extends anteriorly for a considerable distance and posteriorly a short distance along claval suture, the posterior marking anteapical, transcommissural, and subovate, corium with three inner round red spots in an oblique row parallel to claval suture, the anteriormost near midlength of claval suture, and three lobate red spots extending mesad from costal margin, the anteriormost located opposite the midclaval spot, the middle one slightly anterior to a point opposite claval apex and the apical one opposite bases of apical cells and bordered with a small costal hyaline triangular area before and behind, and with two minute posterior round hyaline marginal spots more mesally on its posterior margin; apical portion of inner three apical cells hyaline; face, thoracic pleura, and venter, pale to dull yellow, legs yellow, occasionally suffused with black.



FIGURES 275, 276.—275, *Ladoffa ignota* (Walker) (*c, f,* from holotype; *i* from specimen in Fabrician collection in Copenhagen; remainder from Bartica, British Guiana): *p,* Forewing; *q,* aedeagus from lateral view. 276, *L. yusti,* n. sp. (*a, p,* from topotype; remainder from holotype; paraphysis shown in *e*).

Holotype and four topotypic males, Santo Domingo, Ecuador, November 6, 1953 (H. Yust), collected at lights; and one male, same locality, February 6, 1958 (R. Hodges), (USNM).

This species is named in honor of Harold R. Yust, who has collected many interesting neotropical leafhoppers.

L. yusti, n. sp., differs from all other species in the genus in its unpaired paraphyses and in the peculiar shape of the apical pygofer margin of the male.

Ladoffa donsana, NEW SPECIES

FIGURE 277, PAGE 347

Length of male 6.9-7.0 mm. Head with median length of crown from slightly more than seven-tenths to almost nine-tenths interocular width and from slightly less than one-half to slightly greater than one-half transocular width, muscle impressions distinct or not. Male pygofer moderately produced, macrosetae as in *L. yusti*, n. sp., with a heavily sclerotized apical process arising on dorsal margin, extending ventrally along posterior margin, then mesad, in ventral view slender and acute, not reaching median line, pygofer with a second short, membranous, apicoventral conical structure; plates not extending posteriorly as far as pygofer apex; style and aedeagus as in *yusti;* paraphyses long-stalked with short rami.

Holotype: Ground color of crown black, a pair of longitudinal markings between ocelli and anterolateral margins, red, with an apical small yellow spot; pronotum as in *yusti;* scutellum with median red spot extending forward to anterior scutellar margin but broader in posterior half; forewing much as in *yusti* except that middle spot of clavus is interrupted on claval suture and except that posterior two red spots merge; face, thoracic pleura, and legs, pale yellow. In the two topotypes the colors are faded, but the middle claval spot is as in *yusti*, not interrupted. In the specimen from Balzapamba, Ecuador, the middle of the costal spots is interrupted.

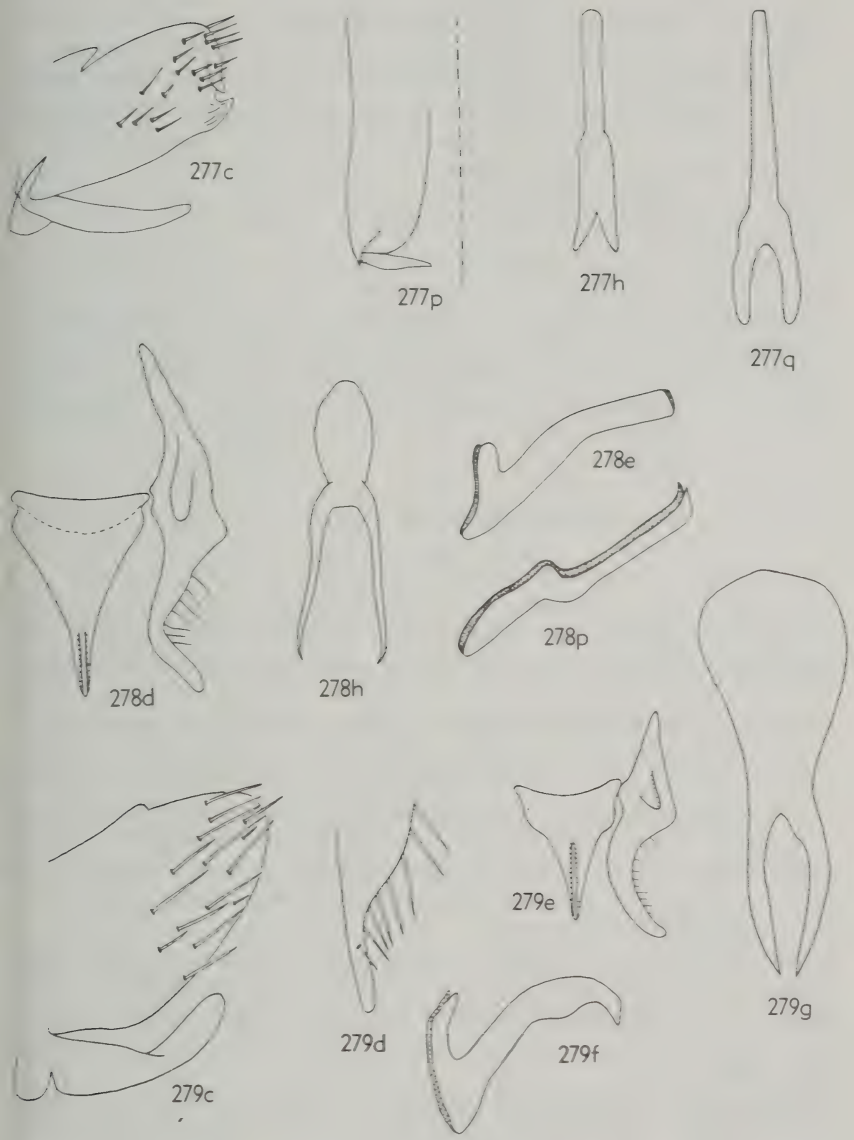
Holotype and two additional males, Turrialba, Costa Rica, March 13-17, 1965 (S. S. and W. D. Duckworth); one male, Balzapamba, Ecuador, March 7, 1938 (W. Clark-Macintyre) (USNM).

L. donsana, n. sp., is very close to *yusti*, n. sp., differing in the shorter male plates, the branched paraphyses and in that the posteroventral pygofer margin is membranous (sclerotized in *yusti*).

Ladoffa insperata, NEW SPECIES

FIGURE 278, PAGE 347

Length of male 6.4 mm. Head with median length of crown from more than nine-tenths of to equal to interocular width; clypeus convex medially, muscle impressions distinct. Male pygofer well produced, apical margin regularly convex, without processes, with few sparse macrosetae arranged in an oblique group on posterior half of disk; plates not extending posteriorly nearly as far



FIGURES 277-279.—277. *Ladoffa donsana*, n. sp. (*q* from specimen from Balzapamba, Ecuador; remainder from Turrialba, Costa Rica; *h* from dorsal view): *p*, Male pygofer apex, right side, from ventral view; *q*, paraphyses from dorsal view. 278, *L. insperata*, n. sp., holotype: *p*, Paraphyses from lateral view. 279, *L. comitis*, n. sp. holotype.

as pygofer apex; style extending posteriorly approximately as far as apex of connective which is subtriangular with apical angle produced; aedeagus with shaft slender, very slightly decurved, truncate apically; paraphyses with stalk shorter than rami which are abruptly curved anterodorsally at apices.

Color of crown red, with broad median stripe and a marginal area before each eye, ivory; pronotum and scutellum tan, the former tinged with red along anterior and anterolateral margins; forewing marked as in *L. paraensis*, n. sp. (below); face, thoracic pleura, and legs, yellow.

Holotype male, Rio Uaupes, Taracuá, (Brazil) April 7, (Roman). One additional male, Fonteboa, Amazonas (RMS).

L. insperata, n. sp., is very closely similar to the following three species, with which it forms a complex. The aedeagus, only slightly decurved and without a convexity on the ventral margin in lateral view, and the erect paraphyses with their abruptly curved apices, are a combination of characters which are distinctive for *insperata*. In the specimen not illustrated, the stalk of the paraphyses is broader than in the type (see fig. 278*h*), approaching the condition found in *L. comitis*, n. sp.

Ladoffa comitis, NEW SPECIES

FIGURE 279, PAGE 347

Length of male 6.4-7.0 mm, of female 6.4 mm. Head with median length of crown from three-fourths to slightly more than eight-tenths interocular width and from four-tenths to less than one-half transocular width; clypeus slightly flattened dorsomedially, muscle impressions not very distinct. Male pygofer well produced, apical margin regularly convex, without processes, with interspersed long and short macrosetae on posterior half of disk; plates and styles as in *L. insperata*, n. sp. (above); aedeagus with shaft slender, more decurved than in *insperata*, usually with an anteapical convexity on ventral margin in lateral view, with an apicoventral angle; paraphyses symmetrical with stalk longer than rami and very broad, rami extending straight posterodorsad in lateral view, apices curved very slightly ventrally in lateral view in some specimens, never curved dorsally.

Color of crown as in *insperata;* pronotum as in *insperata*, or red with a short median stripe anteriorly, a pair of short discal longitudinal stripes, and the lateral margins dull yellow; scutellum dull yellow, tinged with red apically; forewing marked as in *L. paraensis*, n. sp. (below). Face, thoracic pleura, and legs, yellow.

Holotype male, an additional male, and one female, Maroni River, French Guiana (NCS). Two males, Barro do Tapirape, Mato Grosso, Brazil, December 10, 1962 (B. Malkin) (CAS). One male and one female near Mazaruni Head, Pakaraima Mountains, British Guiana, 1932 (J. G. Myers) and one male, Monkey Jump, Essequebo River, British Guiana, October 11, 1929 (Oxford University Expedition) (BM). Holotype on indefinite loan to USNM.

L. comitis, n. sp., is closely related to *insperata*, from which it can be distinguished most readily by the paraphyses in which the stalk is longer than

the rami, and very broad. The rami are occasionally very slightly decurved apically, but not nearly as strongly so as in *L. nozama,* n. sp. The curvature of the aedeagus of *comitis* is intermediate between *insperata* and *paraensis,* but not as great as in the last. The apicoventral angle of the adeagus is more pronounced in two of the *comitis* males than in the illustration (fig. 279*f*) and the ventral shaft convexity may be larger or smaller than illustrated.

Ladoffa paraensis, NEW SPECIES

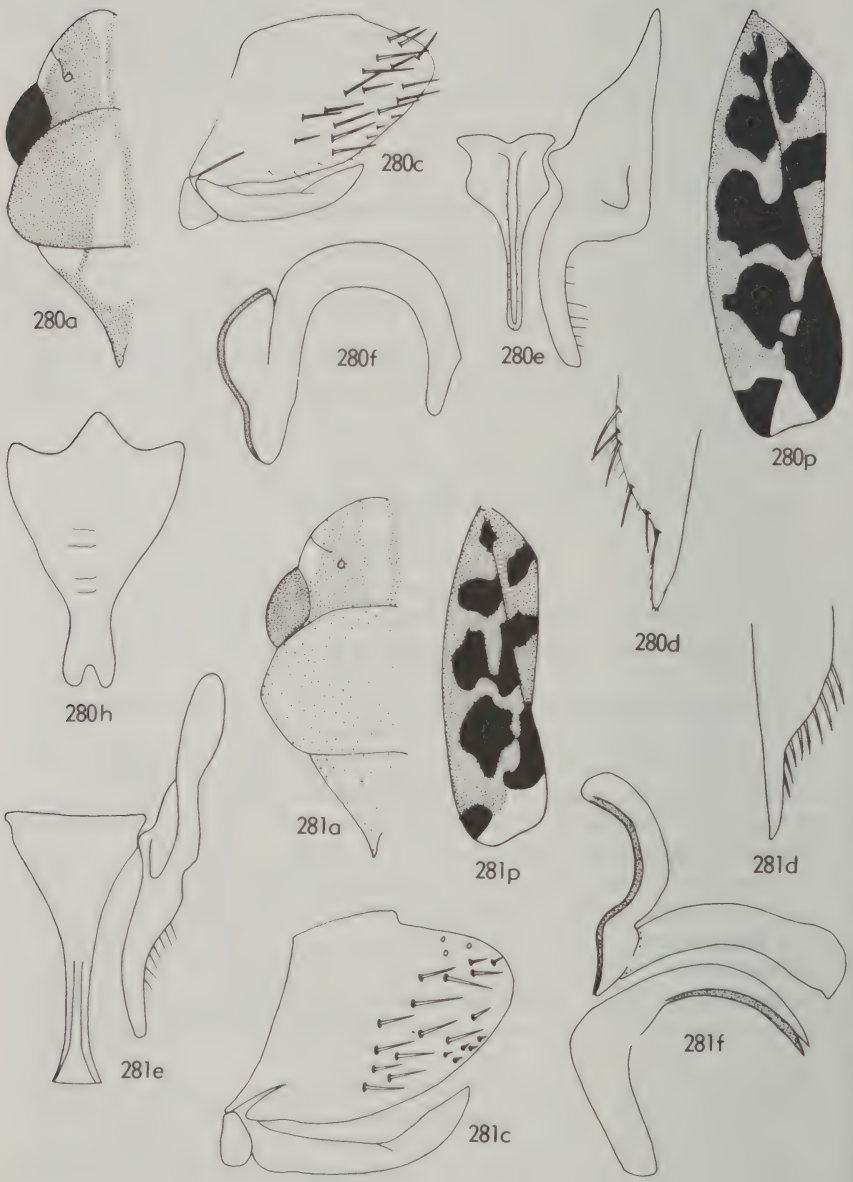
FIGURE 280, PAGE 350

Length of male 6.2-6.6 mm, of female 6.6 mm. Head with median length of crown from seven-tenths to slightly more than eight-tenths interocular width and from four-tenths to slightly less than one-half transocular width; clypeus flattened dorsomedially, muscle impressions not very distinct. Male pygofer moderately produced, apical margin convex, without processes, with mixed long and short macrosetae on posterior half in an oblique group parallel to posteroventral margin, with a few microsetae near ventral margin; plates as in *L. insperata,* n. sp.; style extending posteriorly slightly beyond apex of connective which is abruptly narrowed near midlength, slender through apical half; aedeagus with shaft slender and without processes, in lateral aspect almost semicircular, with an apicoventral lobe; paraphyses occurring as a large sclerite between connective and aedeagus, broad and trilobed basally, narrowed beyond midlength, apex bilobed, the aedeagus articulating between the lobes.

Color of crown red, with a median longitudinal and a marginal area before each eye, dull yellow; pronotum varying from tan margined with red anteriorly and laterally, to red with a median longitudinal dull yellow vitta; scutellum dull yellow, tinged with red apically; forewing red, clavus with a broad marking bordering humeral margin, a broad transverse marking at midclavus, and claval extremity, black; corium with a basal mark straddling claval suture, extending along claval suture to a broad marking in basal half of corium, a broad bilobate marking approximately at midlength, its inner extremity extending anteriorly along claval suture to join midclaval black spot, a discal anteapical marking with or without connections to a spot over inner apical cell, and an apical costal spot with a narrow hyaline anterior border, black, with a triangular hyaline area bordering concave portion of apical wing margin; face, venter, and legs, yellow.

Holotype and two additional males and one female, "Para", Brazil (USNM). One female, "Para", Brazil (MMB).

L. paraensis, n. sp., is closely related to *L. comitis,* n. sp., from which it may be distinguished by its very distinctive paraphyses and by its more arcuate aedeagal shaft in lateral aspect.



FIGURES 280, 281.—280, *Ladoffa paraensis*, n. sp. holotype (*h* from dorsal view): *p*, Forewing. 281, *L. nozama*, n. sp., holotype (paraphyses shown in *f*): *p*, Forewing.

Ladoffa nozama, NEW SPECIES

FIGURE 281, PAGE 350

Length of male 7.4-7.5 mm. Head with median length of crown from two-thirds to less than nine-tenths interocular width and slightly less than one-half transocular width; clypeus flattened mediodorsally, muscle impressions not distinct. Male pygofer moderately produced, apical margin regularly convex, without processes, with mixed large and small sparse macrosetae on apical half; plates extending almost as far posteriorly as pygofer apex; style not extending as far posteriorly as apex of connective which is subtriangular in its basal half, with apical half narrow and slightly expanded at apex; aedeagus with shaft slender, slightly wider at apex in lateral view, with a weak apicoventral angle; paraphysis closely joined to aedeagus, with stalk shorter than rami, in lateral view with rami curved caudoventrally and parallel to aedeagal shaft.

Color of crown dull orange with a median longitudinal stripe and a marginal area before each eye, dull ivory; pronotum and scutellum dull orange; forewing (fig. 281*p*) dull orange marked with black much as in *L. paraensis,* n. sp. (above) except that basal spot straddling claval suture is not connected with next more posterior spot on corium. Face, venter, and legs, yellow.

Holotype male Tonantins, Amazonas, Brazil and one male, "Rio Autaz", Amazonas (Roman) (RMS).

L. nozama, n. sp., is closely related to *paraensis,* from which it can be distinguished most readily by the curvature of its paraphyses in lateral view.

Ladoffa miara, NEW SPECIES

FIGURE 282, PAGE 352

Length of male 6.6-6.8 mm, of female 6.6 mm. Head with median length of crown from slightly more than seven-tenths to more than nine-tenths interocular width, and from slightly more than four-tenths to almost six-tenths transocular width; clypeus convex, muscle impressions indistinct. Male pygofer moderately produced, posterior margin regularly convex and without processes, with a large number of long macrosetae and interspersed short macrosetae on posterior half; plates not extending posteriorly nearly as far as pygofer apex; style extending posteriorly much beyond apex of connective which is Y-shaped; aedeagus with shaft short, not decurved, ventral margin with an elongate acutangular process directed ventrally; paraphyses elongate, short-stalked, the rami abruptly curved mesally anteapically and crossing the median line, each with posterior anteapical margin bearing a few small teeth.

Ground color of crown red, with a median longitudinal stripe, narrowed on anterior half, sordid tan to yellow; ground color of pronotum and scutellum sordid tan, with a median longitudinal and two lateral oblique pronotal red vittae, none reaching anterior margin; scutellum marked with red anteapically; forewing with three prominent red markings, the basal one arcuate and bordering humeral margin, middle spot transcommissural and arcuate,

extending posteriorly in a short lobe along claval suture, posterior spot anteapical and transcommissural; corium with four small red spots in an oblique row parallel to claval suture and three lobate red markings extending mesad from costal margin, located much as in *L. yusti,* n. sp. (above), but with the midcostal and apical spots each bearing a lobe at discal extremity, semihyaline areas as in *yusti;* hindwing with vein m-cu bordered with a red circular spot; face, pleura, venter, and legs, pale to dull yellow.

Holotype male, "Surrubres", Costa Rica, 300 feet (A. Heyne) (MMB). One additional male and two females, Hiquito, San Mateo, Costa Rica (Pablo Schild) (USNM).

L. miara, n. sp., differs from all other species in the genus in its triangular ventral aedeagal process and in the particular form of the paraphyses.

Ladoffa enochra, NEW SPECIES

FIGURE 283, PAGE 353

Length of male 7.8-8.1 mm, of female 7.9 mm. Head with median length of crown from slightly less than eight-tenths of to equal to interocular width and

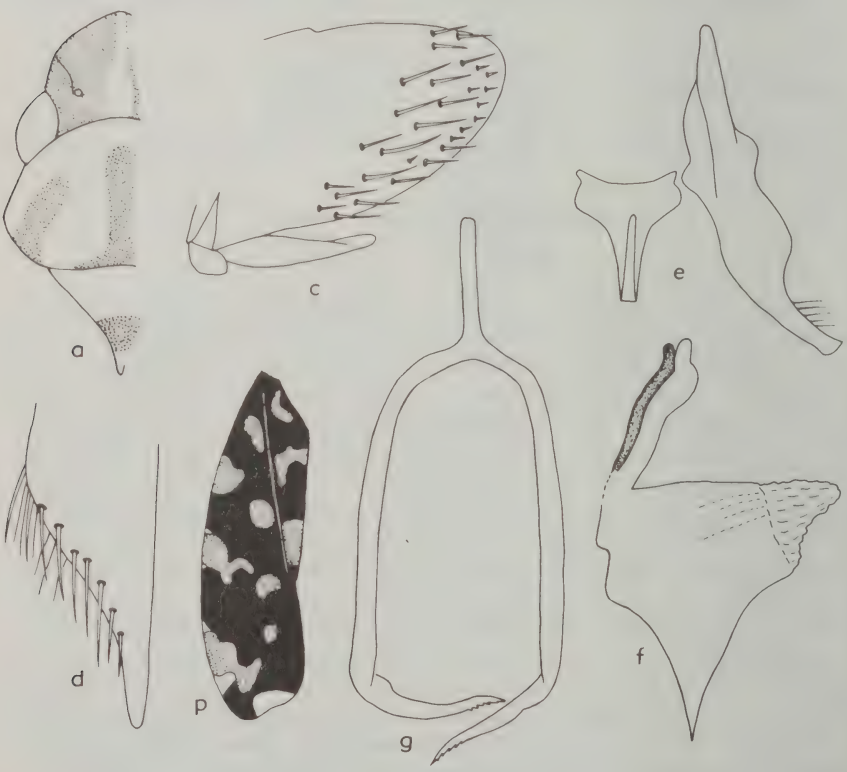


FIGURE 282.—*Ladoffa miara,* n. sp., holotype; *p,* Forewing.

from slightly less than one-half to slightly greater than one-half transocular width; clypeus very slightly flattened medially in its upper half, muscle impressions not distinct. Male pygofer well produced, sharply rounded at apex, without a differentially-sclerotized process, with a number of elongate macrosetae on posterior two-thirds of disk, without interspersed microsetae, with a close-set brushlike group of setae located anteapically on mesal margin; style not extending posteriorly as far as apex of connective which is Y-shaped with the arms widely divergent, or T-shaped; plates not extending posteriorly nearly as far as pygofer apex; aedeagus with shaft only slightly decurved apically, with a slender basal process extending beneath and approximately parallel to long axis of shaft and bifid at apex; paraphyses short-stalked, the rami elongate and parallel through most of their length, slightly divergent apically, the tips acute.

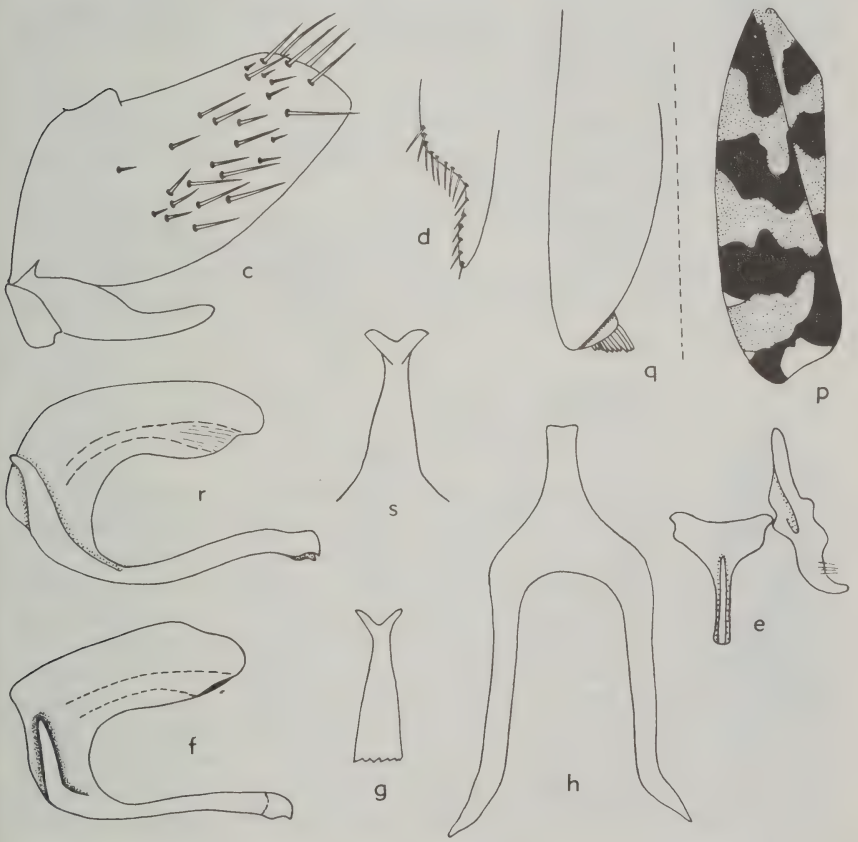


FIGURE 283.—*Ladoffa enochra*, n. sp. (*d*, *e*, *h*, *r*, *s*, from specimen from Minas Gerais, Brazil; *p* from topotype; remainder from holotype; *h* from ventral view): *p*, Forewing; *g*, *s*, apex of ventral aedeagal process from ventral view; *q*, male pygofer apex, right side, from ventral view; *r*, aedeagus from lateral view.

Head sordid tan with a narrow median pale stripe which is slightly broadened at apex; pronotum tan anteriorly, remainder suffused with red; scutellum tan; forewing red with four black claval spots, one near wing base (not shown in illustration), one on humeral margin and not extending to claval suture, one at midclavus and a small one at claval apex, the last two transcommissural and attaining claval suture; corium with four large black markings, one at base and extending posteriorly as a convex lobe along claval suture, a second extending from costal margin to claval suture and basad along latter to connect with midclaval black spot, a third extending completely across wing beyond claval apex and connecting with base of the fourth marking which is arcuate, extending over the apical cells except for a hyaline interruption adjacent to concavity of apical wing margin, with a small hyaline triangular costal spot at posterior margin of third marking and one at anterior margin of fourth, second and third black markings with lobate margins; hindwing with vein m-cu red margined with white; face, thoracic pleura, and legs, yellow to orange yellow.

Holotype male and one female, Santos, Brazil, November 26, 1894 (H. Brauns), one male, Montevideo, Argentina (ZIMH). One female and one specimen without abdomen, Rio de Janeiro, Brazil (CM). One male, "Organ Mt.", Brazil, April, 1935 (USNM).

L. enochra, n. sp., is most closely related to *L. scopigera*, n. sp. (below) from which it can be distinguished by the aedeagal process which is bifid only at the tip, but occurring as two rami separate from their bases in *scopigera*. The red markings of the forewings are much less extensive in *scopigera* (fig. 284*p*) than in *enochra*.

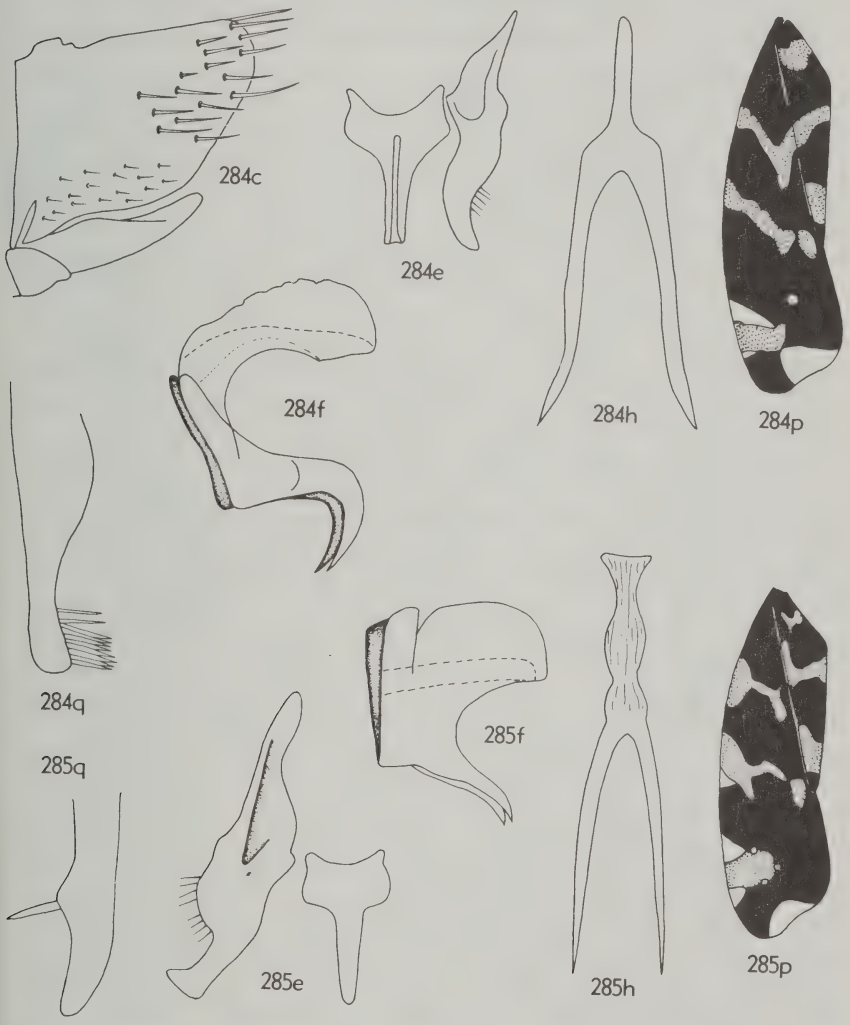
Ladoffa scopigera, NEW SPECIES

FIGURE 284, PAGE 355

Length of male 8.1 mm. Head with median length of crown slightly less than two-thirds interocular width and slightly less than one-half transocular width; clypeus convex medially, muscle impressions not very distinct. Male pygofer not strongly produced, apical margin without process, with a number of elongate macrosetae on posterior half and a number of microsetae near ventral margin, with a brushlike group of close-set large setae arising on mesal margin of pygofer near apex and directed mesally; plates not extending posteriorly nearly as far as pygofer apex; style extending posteriorly approximately as far as apex of connective which is Y-shaped with the arms widely divergent; aedeagus with shaft as in *L. enochra*, n. sp. (above), with a pair of slender basal processes extending parallel to long axis for part of their length, decurved, tapered and acute in their apical one-third; paraphyses as in *enochra*.

Crown, pronotum, and scutellum (partly obscured by pin) tan; forewing brown with a basal and anteapical spot in clavus, the latter transcommissural, a V-shaped transcommissural stripe extending diagonally through clavus before its midlength, posteriorly into corium for a short distance, thence anterolaterally to costal margin, a diagonal stripe extending from near

midlength of costal margin posteromesally to claval suture at its apex, a short stripe extending from costal margin to base of second apical cell, and a small round spot in inner anteapical cell, dull orange, a hyaline area bordering concave portion of apical wing margin and a narrow costal triangular hyaline spot before and behind distalmost costal orange stripe; face, propleura, and legs, sordid yellow.



FIGURES 284, 285.—284. *Ladoffa scopigera,* n. sp., holotype: *p,* Forewing; *q,* male pygofer apex, right side, from ventral view. 285, *L. obscurana,* n. sp. (*p* from topotype; remainder from holotype): *p,* Forewing; *q,* male pygofer apex, left side, from ventral view.

Holotype male, Madre de Dios, Peru, 500 m. (Rolle) (ZIMH).

L. scopigera, n. sp., is closely related to *enochra*, in the discusssion of which distinguishing characters are treated. The two species may be separated from all others in the genus by the tuftlike cluster of large setae on the mesal margin of the pygofer near its apex.

Ladoffa obscurana, NEW SPECIES

FIGURE 285, PAGE 355

Length of male 7.2 mm, of female 6.8-7.5 mm. Head with median length of crown from nine-tenths of, to one-fourth greater than interocular width, and from slightly less than six-tenths to two-thirds transocular width; clypeus flattened medially through part or all of its length, muscle impressions distinct. Male pygofer not strongly produced, posterior margin broadly and slightly convex, with a ventral anteapical aciculate process on each side extending mesad and crossing median line, with a number of macrosetae on posterior two-thirds of disk and near posterodorsal margin, antecosta without apodemes; plates extending posteriorly almost as far as pygofer apex; style extending posteriorly approximately as far as apex of connective which is Y-shaped with the arms divergent; aedeagus with shaft short and broad, ventral margin concave, with a pair of slender, tapering, acute, basiventral processes extending caudoventrally; paraphyses with a narrow, elongate stalk.

Crown, pronotum, and scutellum brown, with a dull ivory median wedge-shaped mark at apex of crown; forewing black with three claval red markings, the anteriormost slender, vermiculate, touching humeral margin, middle marking narrow and transcommissural, extending forward along claval suture, in some specimens connected with anteriormost red marking, hind claval marking broader and extending from claval suture to commissural margin; corium with three transverse red markings extending onto disk from costal margin, the two more anterior ones lobate, the anteriormost one connected with the middle claval red marking, the posterior one with a contiguous triangular hyaline costal marking before and behind and with small hyaline contiguous areoles along its margin on disk, with a triangular hyaline costal spot bordering middle costal red marking, with a hyaline area bordering concave apical wing margin; face, propleura, and legs, yellow.

Holotype male: Tingo María, Peru, June 28, 1962 (W. T. Van Velzen); one topotypic female, February 19, 1950 (H. A. Allard); one female, Santo Domingo, Ecuador, July, 1964 (G. Gregoire), three females, "Santarem", Brazil (USNM). One female, 2-8 miles north of Puyo, Napo, Ecuador 953 meters, February 9, 1955 (E. S. Ross and E. I. Schlinger (CAS). One female, "Santarem", Brazil, July (CM). One male and one female, Santa Cruz, Bolivia (J. Steinbach) (MCZ). One female, Itaituba, Brazil (RMS).

L. obscurana, n. sp., is similar to *L. scopigera*, n. sp., in color and in the male genitalia, but differs in lacking the brushlike pygofer processes of the latter, in that the aedeagal shaft is shorter and its basiventral processes are not decurved.

Ladoffa sannionis, NEW SPECIES

FIGURE 286

Length of male 6.0-6.4 mm, of female 6.5-7.0 mm. Head with median length of crown from eight-tenths to slightly more than nine-tenths interocular width, and from slightly more than four-tenths to slightly more than one-half transocular width; clypeus convex medially, muscle impressions not very distinct. Male pygofer moderately produced with apical margin very broadly rounded and without processes, with a number of mixed elongate and

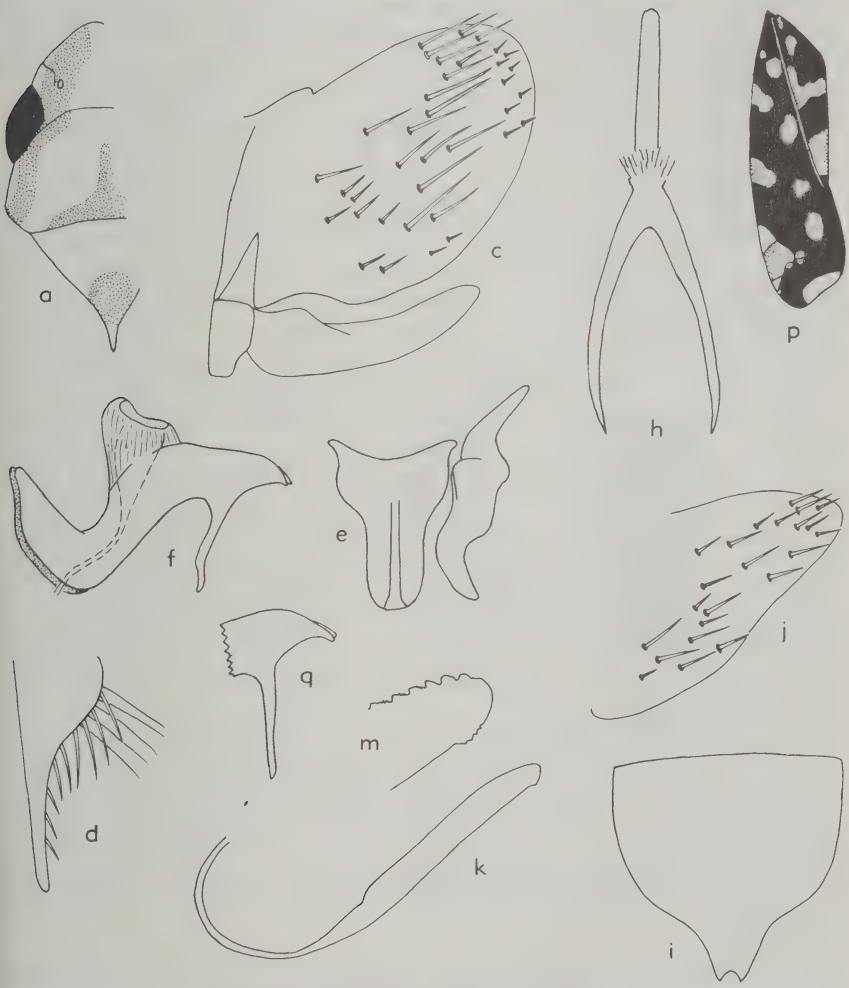


FIGURE 286.—*Ladoffa sannionis*, n. sp. (*a*, *p*, from holotype; *c*, *d*, from specimen from El Zapotal, Chiapas, Mexico; *e*, *h*, *q*, from Panama Canal Zone; *f* from British Guiana; *i-k*, *m*, from Tocumen, Panama; *h* from dorsal view): *p*, Forewing; *q*, apical portion of aedeagus from lateral view.

short macrosetae on posterior two-thirds; plates not extending as far posteriorly as pygofer apex; style extending posteriorly approximately as far as apex of connective which is Y-shaped with arms widely divergent and stem broad; aedeagus with shaft slighty decurved, gonopore located basidorsally, greatly exceeded by apex of shaft which bears a slender unpaired ventral anteapical elongate process which is directed ventrally, and a pair of very short dorsoapical triangular processes; paraphyses long-stalked with rami slender and tapering to acute apices.

Ground color of crown, pronotum, and scutellum, sordid yellow to brown, with a broad lateral oblique stripe on each side of crown, in some specimens extending to apex, the two stripes then contiguous apically, each of the stripes continuing onto pronotum and forming a lateral submarginal border, a median triangular pronotal marking at middle of posterior margin, its apex extending forward onto disk, and scutellum with an anteapical spot, red; forewing black, clavus with one or two red spots opposite humeral margin, a transcommissural stripe across clavus before its midlength, extending laterally to claval suture and forward along inner margin of latter and an anteapical transcommissural spot, red; corium with four small spots in an oblique line parallel to claval suture and with four spots along costal margin, the posteriormost often divided, red, posteriormost costal spot with a contiguous triangular hyaline area before and behind and often with one or more small circular hyaline spots bordering posterior margin; with a small hyaline area bordering concave apical margin; face, propleura, and legs, yellow.

Holotype male, Barro Colorado Island, Panama Canal Zone, May 24, 1940 (J. Zetek), and a long series of specimens from La Ceiba, Honduras; San Marcos, Turrialba, and "Waldeck", Costa Rica; numerous localities in Panama; Bartica, and Essequebo River, British Guiana; "Vera Paz", Guatemala (on cacao); San Estebán, Venezuela; and Los Ríos, Ecuador (USNM). Also from Costa Rica (on sweet lemon); San Isidro del General, Costa Rica; and "Colombia" (NCS); from Bogotá, Colombia (RMS); from Nayarit, and Chapingo, D. F., Mexico, and San Salvador, El Salvador (OSU); from Maracay and Caracas, Venezuela (SSM); from Paramaribo, Surinam (ZIMH); from "Surrubres", Costa Rica (MMB); from Bolivar, Colombia (ZIL); and from Chiapas, Mexico (CAS).

L. sannionis, n. sp., can be readily separated from other species in the genus by the distinctive form of the aedeagus. *L. sannionis* may be separated externally from other species with a somewhat similar color pattern of crown and pronotum, by the midclaval transverse red line which runs forward along the claval suture in *sannionis*.

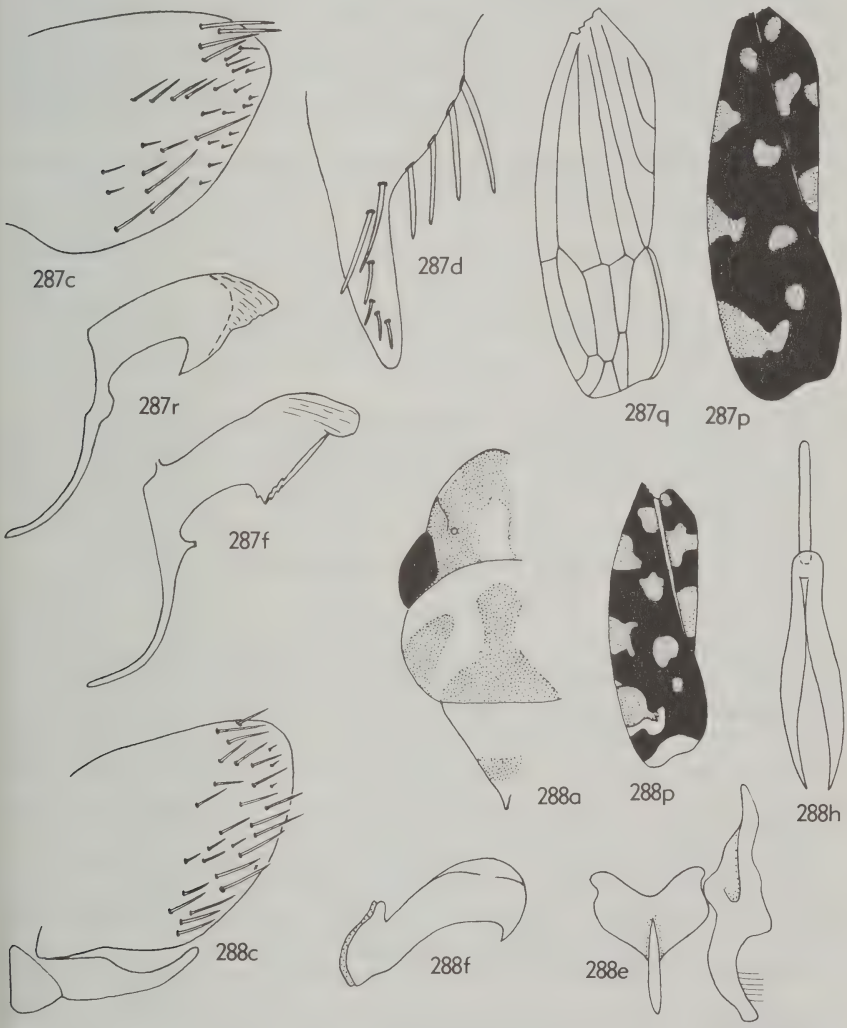
This is the species Fowler (1900a:262) interpreted as *Tettigonia sanguinolenta* Coquebert.

Ladoffa elauta, NEW SPECIES

FIGURE 287, PAGE 359

Length of male 6.1 mm, of female 5.9-6.2 mm. Head with median length of crown from more than eight-tenths of to almost equal to interocular width,

and approximately one-half transocular width; clypeus convex medially, muscle impressions indistinct. Male pygofer moderately produced, apical margin broadly convex without processes, with a number of elongate macrosetae interspersed with short macrosetae on posterior half of disk; plates not extending nearly as far posteriorly as pygofer apex; style extending posteriorly approximately as far as apex connective, which is Y-shaped with arms widely



FIGURES 287, 288.—287, *Ladoffa elauta,* n. sp. (*c, d, f,* from specimen from Costa Rica; *p, q,* from Limón, Costa Rica; *r* from San Pedro de Montes de Oca, Costa Rica; plate not shown in *c*): *p,* Forewing, showing design; *q,* same, showing venation; *r,* aedeagus from lateral view. 288, *L. lentiginosa,* n. sp. (*a, p,* from topotype, remainder from specimen from Mexico): *p,* Forewing.

divergent; aedeagus with shaft short and decurved, its ventral margin concave, with an elongate, slender, slightly curved process arising basiventrally and extending ventrally, with a slight angular anteapical ventral projection. Paraphyses short-stalked, the rami elongate, parallel, gradually tapered.

Color (see remarks below) of crown, pronotum, and scutellum, tan, with an apical median wedge on crown and a pair of median longitudinal spots, a spot on each side on disk of pronotum, pale; forewing with pale spots located as in *L. sannionis*, n. sp. (above) except that the middle of the three claval spots extends slightly posteriorly along claval suture and may be interrupted to consist of two spots, there are only three spots touching costal margin, and that the posteriormost of the costal spots is not divided; face, thoracic pleura, and legs, dull gray.

Holotype male and a series of one additional male, three females and one specimen without abdomen, Limón, Costa Rica, May 12, 1956 (F. Lara E.), on cacao (USNM).

The colors of the type-series are probably not natural. The specimens appear to have been collected in a liquid which affected them in such a way to remove the red, so that the spots of the forewing appear pale whitish. The species is described in spite of this, because the form of the aedeagus will separate it from other species in the genus and because it appears to be of economic importance.

Since the above was written, I have seen a good series from LaLola, Costa Rica, from cacao, collected by M. J. Stelzer in April and May. The specimens are in the University of Wisconsin collection.

Ladoffa lentiginosa, NEW SPECIES

FIGURE 288, PAGE 359

Length of male 6.2-6.4 mm, of female 6.1-6.8 mm. Head with median length of crown from slightly less than nine-tenths to slightly more than nine-tenths interocular width and slightly more than one-half transocular width; clypeus slightly flattened medially in its dorsal one-half, muscle impressions distinct or not. Male pygofer moderately produced, posterior margin very broadly convex, without processes, with a number of elongate macrosetae interspersed with short macrosetae on posterior half of disk; plates not extending posteriorly nearly as far as pygofer apex; style extending posteriorly approximately as far as apex of connective; aedeagus without processes, shaft slightly decurved, ventral margin concave, apicoventral margin extending ventrally and acutangular; paraphyses long-stalked, tapered and acute apically.

Ground color of crown red, with a median longitudinal stripe extending over slightly more than basal one-half, tan; pronotum tan with a median longitudinal and two lateral oblique red stripes, none of which reach anterior pronotal margin; scutellum concolorous with ground color of pronotum, with a conspicuous median anteapical red spot; forewing black with three large red claval spots, the basal one opposite humeral margin, the middle one extending to commisssural margin with an anterior lobe near middle of clavus

and with a posterior lobe extending along claval suture; corium with four small red spots in an oblique line parallel to claval suture and with three red spots along costal margin, the middle one bilobed at its mesal extremity, hyaline areas as in *L. sannionis,* n. sp. (above); face, propleura, and legs, yellow.

Holotype male and one additional male and one female, "Huichichuayan", [Huichapan?] Mexico, September 25, 1938 (L. J. Lipovsky) (NCS). A series of specimens of both sexes from Tamazunchale, Mexico, and "Xaxha" (Yaxja) Guatemala (OSU); from Chiapas, Mexico (UCAL); from Vera Cruz, Mexico (USNM); Oaxaca, Mexico (AMNH); and "Surrubres", Costa Rica (MMB). Holotype on indefinite loan to USNM.

L. lentiginosa, n. sp., can be distinguished from other species in the genus by the form of the aedeagus. The species has color characters similar to those of *L. miara,* n. sp., but the genitalia are quite distinct. Specimens of *lentiginosa* are also colored as in *L. dependens,* n. sp., and can be distinguished from the latter only by the male genitalia.

Ladoffa dependens, NEW SPECIES

FIGURE 289, PAGE 362

Length of male 6.2-6.9 mm, of female 6.9-7.4 mm. Head with median length of crown from two-thirds to nine-tenths interocular width and from slightly less than four-tenths to more than five-tenths transocular width; clypeus slightly flattened medially in its dorsal half, muscle impressions not very distinct. Male pygofer well produced, apical margin strongly convex, without processes, with a diagonal group of mixed long and short macrosetae parallel to posterior and posteroventral margins; style extending posteriorly approximately as far as apex of connective which is Y-shaped with arms widely divergent; aedeagus with shaft narrow, arched posteroventrally, with ventral margin regularly concave, with a basiventral elongate arcuate process, usually (holotype) bearing a short protrusion on its posterior margin, occasionally broadened before apex which is acute; paraphyses long-stalked, rami elongate, slender and subparallel.

Color as in *L. lentiginosa,* n. sp. (above).

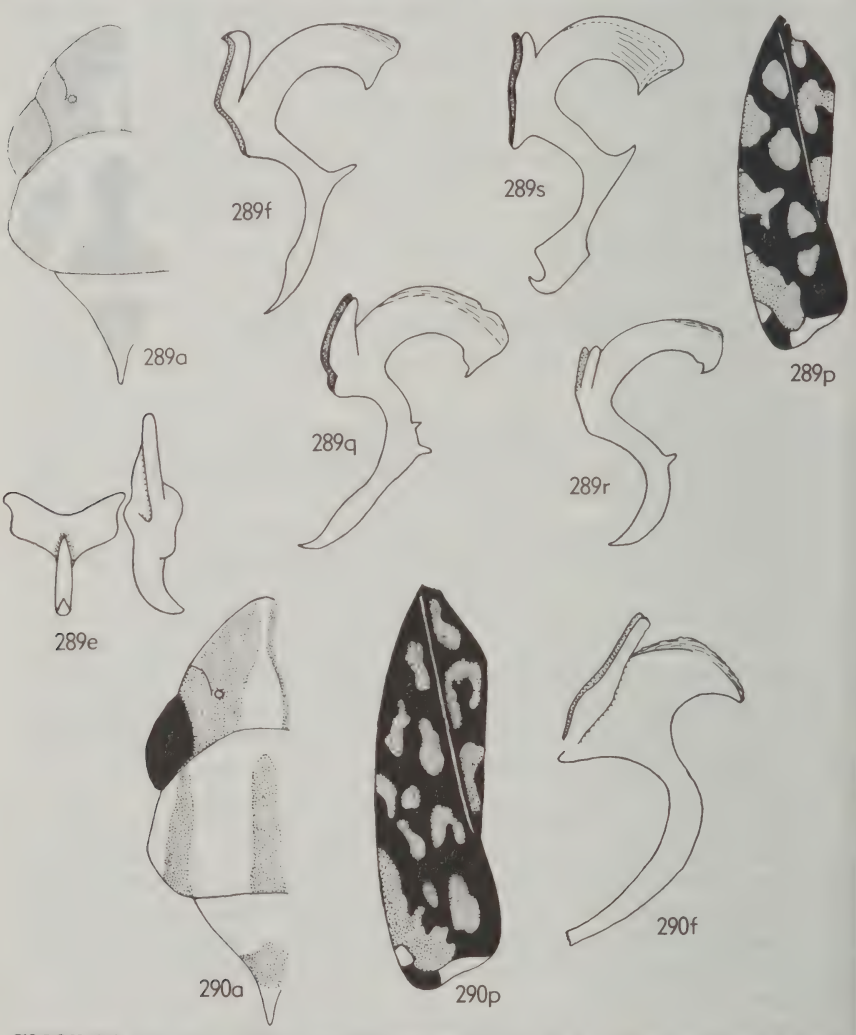
Holotype male, "Columbia", British Honduras, April, 1932 (J. J. White), and five males and four females, same data (NCS). Additional male specimens, Morales, Guatemala (NCS); from La Ceiba, Honduras; Punta Gorda, Honduras; Cayuga, Guatemala; "Vera Paz", Guatemala (on cacao); from banana cargo from Guatemala, May 19, 1935 (USNM); from San José, Costa Rica (ZIMH) and Limón Province, Costa Rica (SPBF). Holotype on indefinite loan to USNM.

Although I have associated a number of females with the males above, I cannot separate females of *L. dependens,* n. sp., from those of *L. lentiginosa.* All of the above distribution records are based on dissected males. *L. dependens* males can be separated readily from other species in the genus by the form of basiventral process of the aedeagus. The new species is closely related to *lentiginosa,* and to *L. arcuata,* n. sp., described below.

Ladoffa arcuata, NEW SPECIES

FIGURE 290

Length of male 7.7-8.2 mm, of female 6.9-7.5 mm. Head with median length of crown from eight-tenths to more than nine-tenths interocular width and from slightly less than one-half to slightly more than one-half transocular width; clypeus slightly flattened medially at midlength; muscle impressions



FIGURES 289, 290.—289, *Ladoffa dependens*, n. sp. (*a*, *e*, *f*, from holotype; *p* from topotype; *q* from specimen from Los Amates, Guatemala; *r* from Costa Rica; *s* from Alto Vera Paz, Guatemala): *p*, Forewing; *q*, *r*, *s*, aedeagus from lateral view. 290, *L. arcuata*, n. sp. (specimen from Morales, Costa Rica); *p*, Forewing.

not very distinct. Male pygofer moderately produced with a number of mixed elongate and short macrosetae arranged in a diagonal group parallel to posterior and posteroventral margin; plates not extending nearly as far posteriorly as pygofer apex; style extending posteriorly approximately as far as apex of connective which is Y-shaped with the arms widely divergent; aedeagus with shaft short, curved posteroventrally, its ventral margin strongly concave, with a slender basiventral arcuate process which is curved anteroventrad and truncate at apex.

Crown red with median line sordid yellow, bordered with tan in its posterior half, with an indistinct oblique narrow brown marking of variable width extending from ocellus to posterior margin; pronotum and scutellum brown with a median and two lateral submarginal longitudinal red stripes, the median stripe not attaining anterior margin; scutellum with an anteapical red mark; forewing black with three arcuate red claval markings, the middle

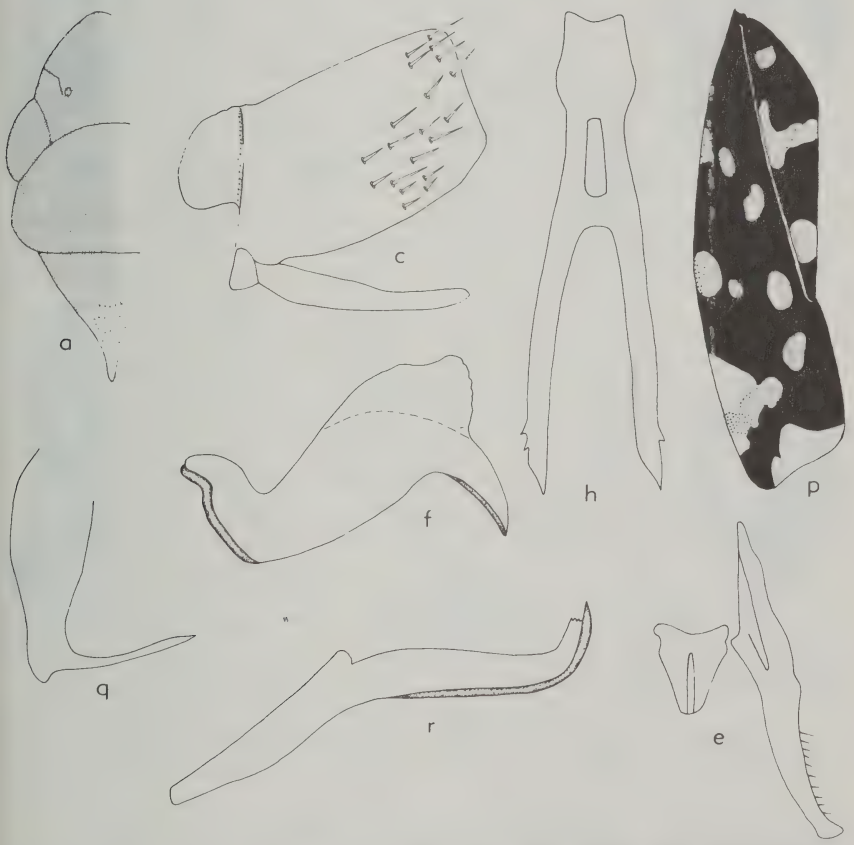
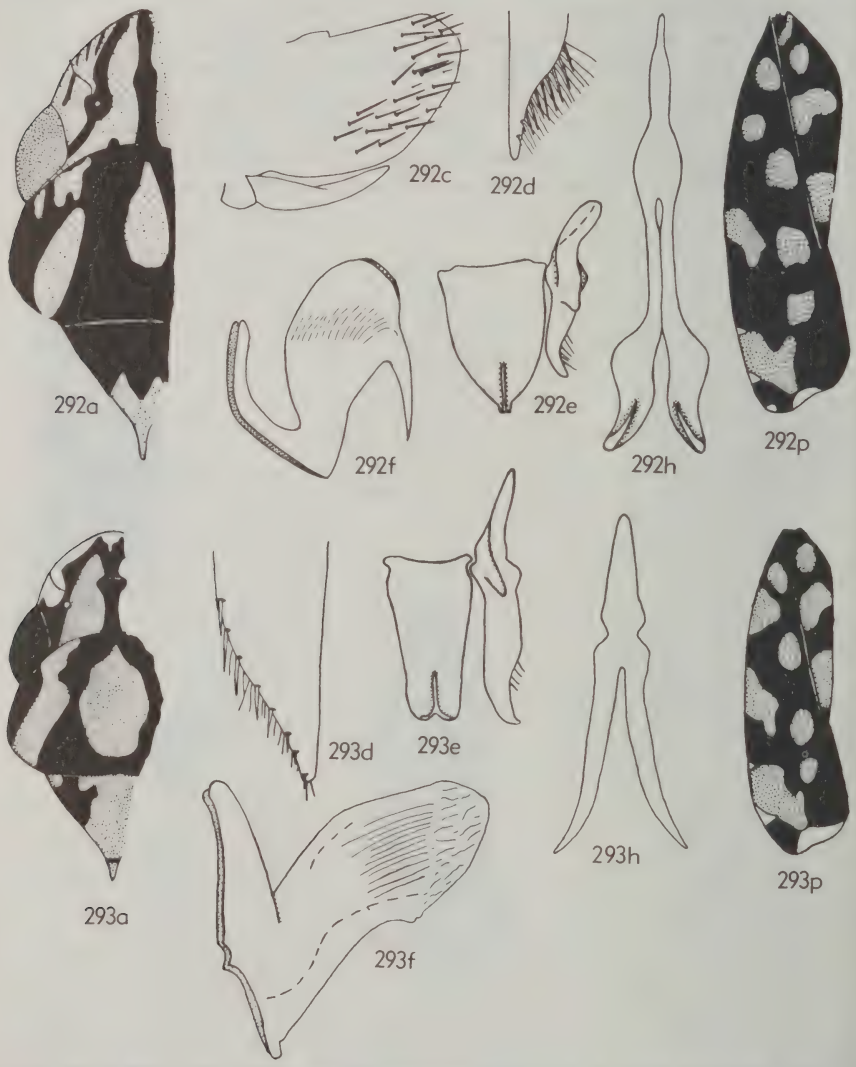


FIGURE 291.—*Ladoffa uncata*, n. sp. (*p* from topotype, remainder from holotype; *h* from ventral view): *p*, Forewing; *q*, male pygofer apex, right side, from ventral view; *r*, paraphyses from lateral view.

one often interrupted, the apical one bordering a black spot bordering commissural margin; corium with a number of red spots and broad vermiculations, one of which, located opposite claval apex, is strongly arcuate with its posterior margin concave; face, propleura, and legs, yellow.

Holotype male, two additional males and five females, San Isidro del General, Costa Rica (D. L. Bounds) (NCS). Additional specimens of both



FIGURES 292, 293.—292, *Ladoffa variolaria,* n. sp. (*a, p,* from specimen from Panama; remainder from holotype; *h* from dorsal view): *p,* Forewing. 293, *L. cavillator,* n. sp. (*p* from specimen from La Ceiba, Honduras; remainder from holotype): *p,* Forewing.

sexes from Potrerillos, Panama (NCS); from Waspuc River, Musawas, Nicaragua (UCAL); from several Panama localities, Guatemala, and Costa Rica (USNM). Holotype on indefinite loan to USNM.

L. arcuata, n. sp., is closely similar to *L. dependens,* n. sp., in the form of the aedeagus, but the basiventral aedeagal process lacks the small protuberance(s) found in *dependens.* The arcuate midclaval red spot and the corial arcuate red spot opposite the claval apex will serve to distinguish *arcuata* from other species.

Ladoffa uncata, NEW SPECIES

FIGURE 291, PAGE 363

Length of male 6.5-6.9 mm, of female 6.5-6.8 mm. Head with median length of crown varying from almost nine-tenths of, to equal to interocular width, and from one-half to slightly more than one-half transocular width; clypeus convex, slightly flattened mediodorsally in some specimens, muscle impressions distinct. Male pygofer not strongly produced, posterior margin truncate, with a ventroapical slender process extending mesally across median line, with few macrosetae on posterior half of disk, antecosta near median line broadly expanded, platelike; plates extending posteriorly almost as far as pygofer apex; style extending posteriorly much beyond apex of connective which is subtrapezoidal; aedeagus with shaft extending posterodorsally, ventral margin convex with a pair of apicoventral processes extending posteroventrally; paraphyses broadly stalked, the rami with few anteapical teeth; female abdominal sternum VII with lateral lobes produced almost as far posteriorly as median lobe.

Crown and pronotum dark gray; scutellum concolorous with crown and pronotum, with an anteapical red spot; forewing black with three claval red markings, the middle one extending from commissural to claval margin and anteriorly along latter; corium with only three red spots in a row parallel to claval suture, remaining corial red spots somewhat variable, with three costal red spots not extending uninterruptedly towards disk of clavus, but usually interrupted with black, apical costal spot with hyaline area before and behind and bordering costa, with a marginal hyaline area bordering concave apical margin; face, propleura, and legs, yellow.

Holotype male, Barro Colorado Island, Panama Canal Zone, April 28-30, 1964 (W. D. and S. S. Duckworth), five males and one female, same data; two topotypic males, May 1-9, 1964, same collectors, one female May 10-17, 1964, same collectors; and one male, Mojinga Swamp, Panama Canal Zone, November 20, 1951 (F. S. Blanton) (USNM).

L. uncata, n. sp., differs from all other species in the genus in the paired apicoventral processes of the aedeagus.

Ladoffa variolara, NEW SPECIES

FIGURE 292, PAGE 364

Length of male 8.1-8.5 mm. Head with median length of crown from two-thirds to eight-tenths interocular width and from four-tenths to almost one

half transocular width. Male pygofer moderately produced, posterior margin broadly convex, without processes, with a number of macrosetae on posterior half of disk, with few interspersed very small setae; plates not extending nearly as far posteriorly as pygofer apex; style not extending as far posteriorly as apex of connective which is almost semiovate in form; aedeagus with shaft broad, extending posterodorsally, ventral margin concave, with an apical medioventral unpaired slender acute process extending ventrally; paraphyses long-stalked, with rami slender and contiguous in their basal halves, swollen and divergent in their apical halves before the slender acute recurved apices.

Head red, with a median longitudinal and an oblique lateral stripe passing through ocellus on each side, black; pronotum black with a median discal longitudinal stripe which does not attain anterior or posterior margin, two lateral slightly oblique stripes extending full length except for a slight interruption behind anterior margin, and a small spot bordering anterior margin near its lateral extremity, red; clavus with four red spots, the basal two opposite humeral margin and fused in some specimens, the middle spot lobate and extending slightly posteriorly along claval suture, the posteriormost located anteapically; corium with four large red spots in an oblique line parallel to claval suture and with three large red spots along costal margin, extending to claval disk, with a small triangular costal hyaline spot before and behind posteriormost red spot and a narrow hyaline area bordering concave apical margin of wing.

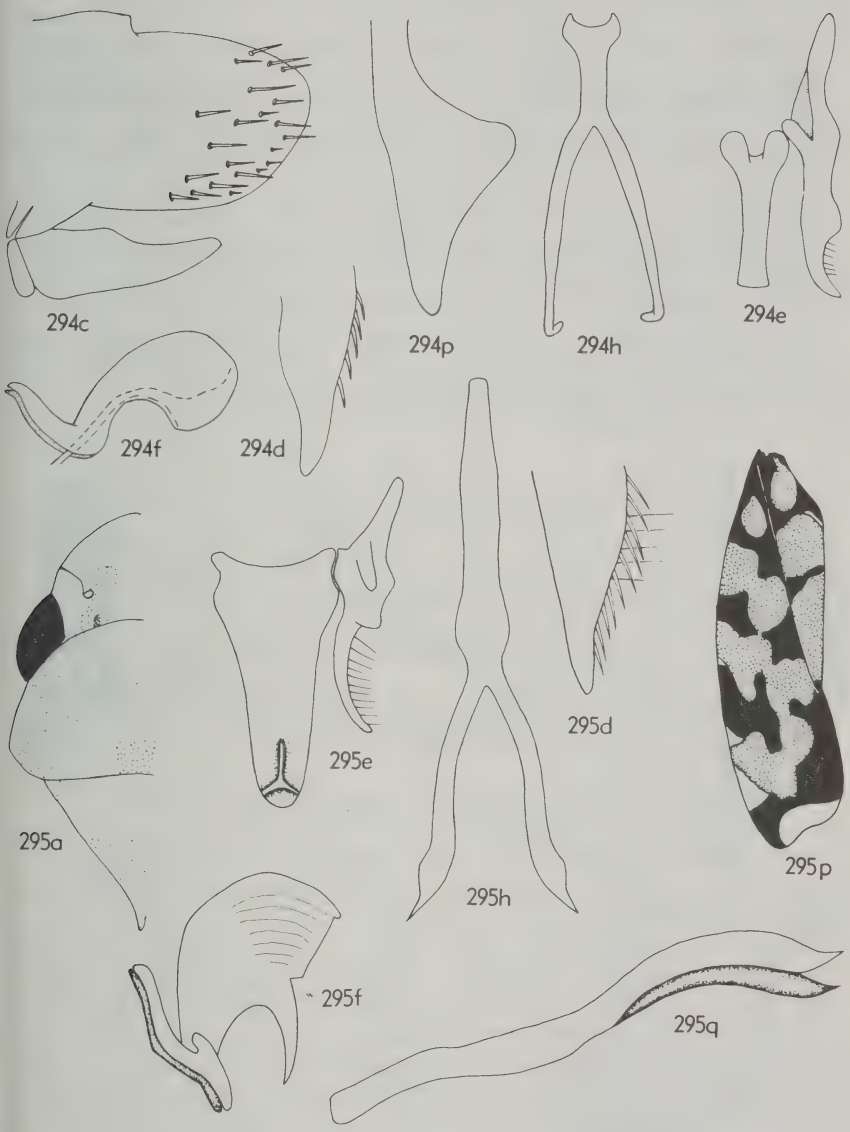
Holotype male, El Valle, Panama, November, 1946 (N. L. H. Krauss); one male, Fort Davis, Panama Canal Zone, August 28, 1952 (F. S. Blanton); one male, Campinas, Panama, September 16, 1952 (F. S. Blanton); one male, Cerro Campana, Panama Province, Panama, April 19, 1952 (F. S. Blanton); and one specimen without abdomen, Turrialba, Costa Rica (Schild and Burgdorf) (USNM).

L. variolaria, n. sp., can be separated readily from other species in the genus by the distinctive form of the paraphyses of the male.

Ladoffa cavillator, NEW SPECIES

FIGURE 293, PAGE 364

Length of male 6.6-6.8 mm, of female 6.9 mm. Head with median length of crown from almost three-fourths of, to almost equal to, interocular width, and from slightly less than one-half to slightly greater than one-half transocular width; clypeus convex medially, muscle impressions not distinct. Male pygofer moderately produced, apical margin convex, without processes, with rather sparse mixed elongate and short macrosetae from middle of disk to posterodorsal margin; plates not extending posteriorly nearly as far as posterior pygofer margin; style extending approximately as far posteriorly as apex of connective which is elongate-trapezoidal; aedeagus without processes, shaft curved slightly, its ventral margin slightly concave; paraphyses with stalk moderately long, rami tapering to acute tips.



FIGURES 294, 295.—294, *Ladoffa coccinea* (Fowler) (from specimen from Córdoba, Vera Cruz, Mexico; *h* from dorsal view): *p*, Male pygofer apex, right side, from ventral view. 295, *L. purpurascens* (Fowler) (from specimen from Vera Cruz, Mexico; *h* from dorsal view): *p*, Forewing; *q*, paraphyses from lateral view.

Ground color of crown, pronotum, and scutellum, red, with a narrow median longitudinal line which is slightly broadened at midlength and an oblique line on each side of crown, black, the latter submarginal and delimiting anterolateral marginal areoles of yellow or red; pronotum with a pair of longitudinal lines across disk, fused at anterior and posterior margins and a lateral marginal longitudinal band on each side, black; scutellum with a lobate black marking delimiting each basal angle; forewing black with red markings much as in *L. variolaria*, n. sp., above; face, thoracic pleura, and legs, yellow.

Holotype male, Cayuga, Guatemala, January, 1951 (William Schaus); one male, "Esquintla", Guatemala, May (Schaus and Barnes); one male, September 23 and one female, September 24, La Ceiba, Honduras (F. J. Dyer) (USNM); one female, Los Amates, Guatemala, February 18-28, 1905 (OSU).

Ladoffa cavillator, n. sp., is somewhat similar to *L. variolaria*, n. sp., in color, but is much smaller, and without aedeagal processes or recurved apices of the paraphyses, both of which are characteristic of *variolaria*.

FIGURE 296.—*Ladoffa rubriguttata* (Walker) (*a, f, p*, from specimen from Mojinga Swamp, Panama Canal Zone; remainder from San Isidro del General, Costa Rica): *p*, Forewing; *q*, style apex from lateral view; *r*, aedeagus from lateral view.

54. SOOSIULUS, NEW GENUS

FIGURES 297-322

Type-species: *Poeciloscarta fabricii* Metcalf.

Length of male 5.8-9.4 mm, of female 6.0-8.6 mm.

Head well produced, median length of crown from slightly more than four-tenths to slightly less than nine-tenths interocular width and from approximately three-tenths to slightly more than one-half transocular width, anterior margin somewhat narrowly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly before a line between anterior eye angles, and each equidistant or nearly so from adjacent anterior eye angle and median line of crown, with area between ocelli flattened or slightly concave, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins rectilinear and oblique; clypeus convex, muscle impressions distinct or not, face without pubescence, transclypeal suture interrupted medially, clypellus with profile continuing contour of clypeus.

Thorax with pronotal width variable compared to transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk without sculpturing or pubescence; scutellum without sculpturing. Forewing with membrane present, variable in extent interspecifically, veins indistinct, not elevated, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins, texture at least partly coriaceous, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of second and third, with two parallel longitudinal rows of very small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin convex, with fairly numerous macrosetae usually extending in a broad diagonal group from middle of disk posterodorsally to dorsoapical margin, occasionally with a few interspersed microsetae, without processes. Plates slender, triangular, not extending posteriorly as far as pygofer apex, with few uniseriate macrosetae. Style extending posteriorly to a varying degree with relation to apex of connective, usually without preapical lobe. Connective extremely variable interspecifically: from a simple transverse bar or a short T-shaped structure to a very elongate broad structure of various forms. Aedeagus not very elongate, symmetrical or not (variable interspecifically), with or without processes which may be unpaired or paired and anteapical or apical, the variation being interspecific. Paraphyses present and usually paired and symmetrical (exception: *S. fulgidus,* n. sp., in which they are reduced to a longitudinal bar-like sclerite at apex of connective).

Female abdominal sternum VII with apical margin quite variable interspecifically. Dorsal wall of genital chamber sclerotized or not. Ovipositor with second valvula broad beyond basal curvature, and with quadrate primary teeth, each bearing minute secondaries, apex convex, apicoventral margin

slightly concave in some species. Pygofer with few macrosetae located parallel to apical and posteroventral margin.

All of the species of *Soosiulus* are red or orange, marked with black.

The range of the genus is from Costa Rica and Panama through the Amazon Valley in Brazil and to Peru and Bolivia. The genus is similar in appearance to *Ladoffa*, new genus, and the form of the aedeagus of several of the species (e.g. *servulus* (Melichar); *decoris*, n. sp.; *falcifer*, n. sp.) suggests a relationship to *Ladoffa* and other genera in the *Diedrocephala* complex, but the forewings are not concave apically, and the variations in the connective are not found in *Ladoffa*. *Soosiulus* is also similar to *Ramosulus*, new genus, in the treatment of which distinguishing characters are discussed.

This genus is named in honor of Dr. Árpad Soós of the Magyar Nemzeti Muzeum whose assistance and cooperation have contributed to this work, and whose hospitality made a January visit to Budapest a warm memory.

I have placed *Tettigonia configurata* Walker in *Soosiulus* after a study of the lectotype, which is without an abdomen.

The male genitalia of the Fabrician type of *Soosiulus fabricii* (Metcalf) agree well with figure 300. The present interpretation of *Tettigonia salutaris* Fowler rests on a comparison of the anterior dorsum of the female lectotype, with an earlier sketch of those structures (fig. 305*a*).

The male genitalia of the lectotype of *Cardioscarta solida* Melichar agree well with figure 314. A male compared externally with the lectotype of *Tettigonia trivirgata* Fowler has genitalia like those illustrated here.

SPECIES OF *SOOSIULUS*

azatus, n. sp. N. Brazil.
comitatulus (Melichar), 1932a:297 (*Cardioscarta*). Peru. New combination.
configuratus (Walker), 1858b:216 (*Tettigonia*). Brazil. New combination.
decoris, n. sp. Peru.
dextrorsus, n. sp. Br. Guiana, NW. Brazil.
fabricii (Metcalf), 1965a:65 (*Poeciloscarta*) (new name). Venezuela, the Guianas, N. and E. Brazil. New combination.
cruenta (Fabricius), 1798a:521 (*Cicada*) (preoccupied).
facis, n. sp. Fr. and Br. Guiana.
falcifer, n. sp. N. and NE. Brazil.
febris, n. sp. Colombia.
flammidulus (Jacobi), 1905c:178 (*Tettigoniella*). Peru, Bolivia. New combination.
fucatus, n. sp. Costa Rica, Nicaragua.
fulgidus, n. sp. Colombia.
hastatus, n. sp. E. Brazil.
interpolis, n. sp. NW. Brazil.
klagesi, n. sp. E., N., NW. Brazil.
lunatus, n. sp. N. Brazil, Peru.
maroniensis, n. sp. Fr. Guiana.
mirus, n. sp. Peru.
regalis, n. sp. NW. Brazil.
ruber, n. sp. N. and NW. Brazil, Peru.
salutaris (Fowler), 1900d:281 (*Tettigonia*). Costa Rica, Panama. New combination.
sermunculus (Melichar), 1932a:295 (*Cardioscarta*). NE. Brazil, D. Guiana, Peru, Bolivia. New combination.

servulus (Melichar), 1932a:293 (*Cardioscarta*). Fr. and D. Guiana, NW. Brazil, Ecuador, Peru, Bolivia. New combination.
solidus (Melichar), 1932a:293 (*Cardioscarta*). N. and NW. Brazil, Peru. New combination.
trivirgatus (Fowler), 1900a:259 (*Tettigonia*). Costa Rica, Panama. New combination.
umaritubanus, n. sp. NW. Brazil.
velocissimus (Melichar), 1932a:294 (*Cardioscarta*). Peru, Bolivia. New combination.

KEY TO SPECIES OF *SOOSIULUS*

(*S. configuratus* (Walker) and females of *S. decoris*, n. sp. not included).

1. Forewings not marked with black, except inner apical cell and occasionally claval suture ..... *comitatulus* (Melichar) (fig. 318) *flammidulus* (Jacobi) (fig. 319)
   Forewings with more extensive black markings, or with black markings otherwise 2
2. Pronotum without any black marking touching posterior margin 3
   Pronotum with at least some black marking touching posterior margin 6
3. Head with a median apical black mark 4
   Head without a median apical black mark 5
4. Head with a basal black marginal stripe extending from eye to eye, pronotal black marking not interrupted ..... *fulgidus*, n. sp., page 394
   Head with a pair of spots in basal half of crown; pronotal dark marking interrupted medially ..... *facis*, n. sp., page 397
5. Scutellum completely black, or nearly so; female abdominal sternum VII deeply and narrowly excised in more than apical half of its length *servulus* (Melichar) (fig. 310)
   Scutellum almost always orange behind transverse suture; female abdominal sternum VII with a median apical convexity which may be shallowly notched or not ..... *velocissimus* (Melichar) (fig. 322)
6. Pronotum with longitudinal dark markings extending from anterior to posterior margin without interruption on disk (Central American species) 7
   Pronotum with black markings not extending from anterior to posterior margin without interruption (South American species) 9
7. Median orange pronotal stripe attaining anterior pronotal margin *fucatus*, n. sp., page 393
   Median orange pronotal stripe not attaining anterior pronotal margin 8
8. Lateral pronotal margins black, wing markings distinctly delimited *salutaris* (Fowler) (fig. 305)
   Lateral pronotal margins pale, wing markings poorly delimited *trivirgatus* (Fowler) (fig. 307)

9. Clavus of forewings at rest with commissural black marking strongly narrowed or interrupted opposite scutellar apex 10
Clavus with commissural vitta extending to humeral margin without being narrowed opposite scutellar apex ..... *mirus*, n. sp., page 397

10. Forewing with black stripe on claval suture broad, extending apically to appendix without narrowing appreciably 11
Forewing with black stripe on claval suture absent or very narrow through part or all of its length, or truncate before apex of claval suture, or curving onto apical portion of corium and with or without a very narrow branch extending apically to appendix 13

11. Pronotum with a black spot on posterolateral margin near base of forewing on each side ..... *febris*, n. sp., page 382
Pronotum without such black spots 12

12. Male with aedeagus elongate, its ventral margin regularly concave in lateral view and with paired ventroapical small processes (fig. 315*f*) *lunatus*, n. sp., page 392
Male with aedeagus much shorter, its ventral margin less regularly concave in lateral view and with an unpaired ventroapical process *sermunculus* (Melichar) (fig. 297)

13. Forewing with two longitudinal or diagonal black stripes, in addition to black markings bordering commissural margin (outer stripe may be faint) 14
Forewing with only one longitudinal or diagonal black stripe, in addition to black markings bordering commissural margin 23

14. Forewing with an anteapical black spot 15
Forewing without such a spot 16

15. Length more than 9.0 mm; forewing with outer stripe much narrower than inner; aedeagus with an apicoventral elongate process *regalis*, n. sp., page 376
Length less than 8.0 mm; forewing with outer stripe conspicuous; aedeagus without such a process ..... *solidus* (Melichar) (fig. 314)

16. Males 17
Females (female of *S. decoris*, n. sp., unknown) 21

17. Aedeagus with apicoventral process very short, comparatively blunt *sermunculus* (Melichar) (fig. 297)
Aedeagus with apicoventral process longer, more acute (figs. 301*f* and 308*f*) 18

18. Aedeagus with apical process directed dextrally *dextrorsus*, n. sp., page 381
Aedeagus with apical process directed ventrally 19

19. Paraphyses in lateral view with rami crescentiform; connective abruptly narrowed in apical half (fig. 308*e*) ..... *decoris*, n. sp., page 385
Paraphyses in lateral view less regularly curved; connective not narrowed abruptly 20

20. Aedeagus with apical process longer and more slender; paraphyses in lateral view curved more strongly dorsally ..... *falcifer*, n. sp., page 376
Aedeagus with apical process shorter; paraphyses less strongly curved dorsally ..... *azatus*, n. sp., page 378

21. Abdominal sternum VII with posterior margin convex 22
Abdominal sternum VII with posterior margin subtruncate, shallowly emarginate medially ..... *sermunculus* (Melichar) (fig. 297*i*)

22. Abdominal sternum VII with posterior margin broadly, regularly rounded (fig. 304*i*) ..... *dextrorsus*, n. sp., page 381
Abdominal sternum with posterior margin much more narrowly rounded (fig. 302*i*) ..... *azatus*, n. sp., page 378

23. Pronotum with anterior margin entirely black-margined including portion behind eyes ..... *maroniensis*, n. sp., page 385
Pronotum with anterior margin orange behind eyes 24

24. Forewing without black markings other than at commissural margin and the claval suture itself (not its border), or with very faint dark stripe along claval suture ..... *hastatus*, n. sp., page 387
Forewing with distinct black stripe along claval suture 25

25. Forewing with transverse orange claval marking near scutellar apex slightly broadened at its mesal extremity .... *interpolis*, n. sp., page 374
Forewing with transverse orange claval marking not broadened mesally 26

26. Females 27
Males 30

27. Abdominal sternum VII with posterior margin produced in three convex lobes ..... *fabricii* (Metcalf) (fig. 300)
Abdominal sternum VII not so 28

28. Abdominal sternum VII with posterior margin regularly convex almost from side to side ..... *ruber*, n. sp., page 389
Abdominal sternum VII not as above 29

29. Abdominal sternum VII with a median hemispherical protuberance near midlength ..... *umaritubanus*, n. sp., page 380
Abdominal sternum VII not so, but often with a longitudinal rounded carina which may be abruptly more convex near apical margin
klagesi, n. sp., page 390
falcifer, n. sp., page 376

30. Aedeagus with a pair of dorsoapical processes (fig. 312*f*)
ruber, n. sp., page 389
Aedeagus without dorsoapical processes 31

31. Aedeagus without a ventroapical process ..... *klagesi*, n. sp., page 390
Aedeagus with a ventroapical process 32

32. Aedeagus with ventral margin of shaft nearly straight proximad of apex in lateral view; paraphyses with apices curved slightly downward in lateral view ..... *umaritubanus*, n. sp., page 380
Aedeagus with ventral margin of shaft strongly curved; paraphyses directed dorsally at apices ..... *fabricii* (Metcalf) (fig. 300)

Soosiulus interpolis, NEW SPECIES

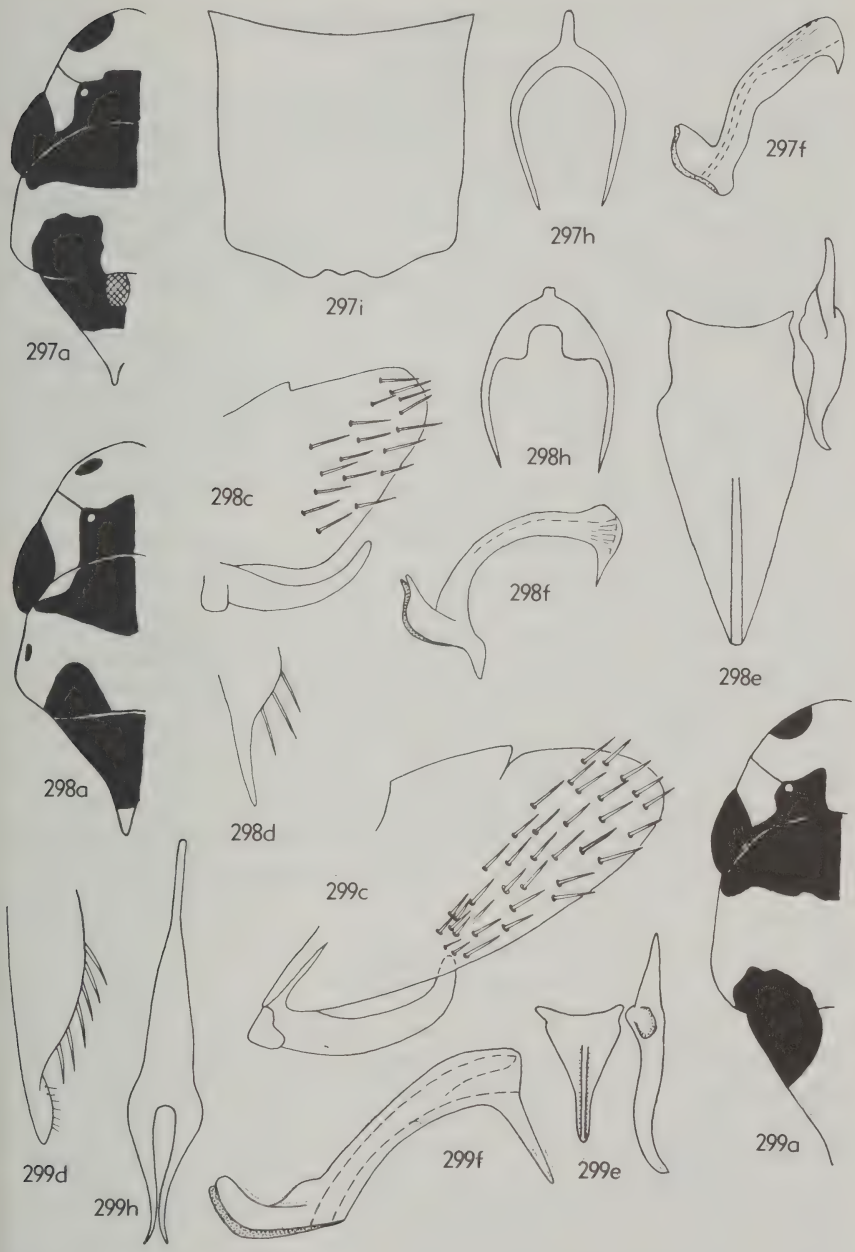
FIGURE 298, PAGE 375

Length of both sexes 6.0 mm. Head with median length of crown from slightly more than six-tenths to slightly less than seven-tenths interocular width and approximately one-half transocular width, ocelli located slightly before a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, clypeus with muscle impressions distinct or not. Thorax with pronotal width approximately equal to transocular width of head, forewing with membrane including inner apical cell and apical portions of second and third apical cells. Male pygofer without microsetae; plates not extending nearly as far posteriorly as pygofer apex, with three or four uniseriate macrosetae; style extending posteriorly to a point less than one-half length of connective; connective sagittate in form, with a median keel in apical half of length; aedeagus symmetrical, regularly curved, in lateral view, with ventral margin regularly concave, apex slightly expanded with a ventroapical short acute process; paraphyses short-stalked, each of the rami with a slight convexity on inner margin near base. Female abdominal sternum VII with posterior margin gradually narrowed to a narrow median excision that extends almost to base. Other structural characters as in generic description.

Crown, pronotum, and clavus of forewings bright orange, head with a small marginal spot on each side near apex and a large median basal spot including ocelli, black; pronotum with a median spot extending along anterior margin, with a slender arm extending laterally behind eye on each side, a small spot on each side near lateral margin on posterior half, a pair of semi-oval spots on hind margin, black; scutellum black except apex; forewing with a spot on each humeral margin connected by a narrow band along commissural margin to a large transcommissural hastate marking in clavus, all of which are black, claval suture narrowly black from base almost to apex, the black line extending into corium parallel to base of inner apical cell; the bright orange color of clavus continuing across inner apical cell and other apical cells, remainder of corium translucent yellow to dull orange.

Holotype male and a series of additional males, and one female, Taracuá, Amazonas, Brazil, all collected in the first ten days of March (RMS).

S. interpolis, n., sp., is closely related to *S. sermunculus* (Melichar) from which it may be distinguished by its more strongly curved aedeagal shaft in lateral view, and by the expansion of the inner margins of the arms of the paraphyses at their bases. The excision of the abdominal sternum VII of the female is similar to that of *S. servulus* (Melichar) but the hind margin is not produced medially as much as in *servulus*.



FIGURES 297-299.—297, *Soosiulus sermunculus* (Melichar) (*f*, *h*, from lectotype; *a* from topotype; *i* from specimen from Marcapata, Peru). 298, *S. interpolis*, n. sp., holotype (*h* from dorsal view). 299, *S. regalis*, n. sp., holotype (*h* from dorsal view).

Soosiulus regalis, NEW SPECIES

FIGURE 299, PAGE 375

Length of male 9.4 mm. Head with median length of crown slightly more than two-thirds interocular width and slightly less than one-half transocular width, ocelli located behind a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown; clypeus with muscle impressions not very distinct. Forewing with membrane including inner apical cell and apical portions of second, third, and fourth apical cells. Male pygofer without microsetae; plates very short, not extending nearly as far posteriorly as pygofer apex, with uniseriate macrosetae more numerous than in *S. interpolis*, n. sp.; style extending posteriorly farther than apex of connective; connective elongate, triangular, with a median keel in apical two-thirds; aedeagus symmetrical, regularly and slightly curved in lateral view, with ventral margin regularly concave, apex scarcely expanded, with a ventroapical acute process which is directed ventrally; paraphyses long-stalked, with rami shorter than stalk. Female unknown. Other structural characters as *interpolis*.

Color of dorsum and forewings bright orange, crown with a round spot on each side behind apex and a quadrate spot at base on each side of median line, broad anterior margin of pronotum, a pair of oval spots extending from hind margin of pronotum across basal angles of scutellum onto humeral portions of forewings, commissural margin of clavus, a stripe in basal two-thirds of brachial cell, usually a shorter and narrower one between latter and costal margin (not present in holotype), an oval to quadrate marking in anteapical cells, apical membrane, and part of costal margin, black; occasionally (not in holotype) with a broad subcostal hyaline amber area.

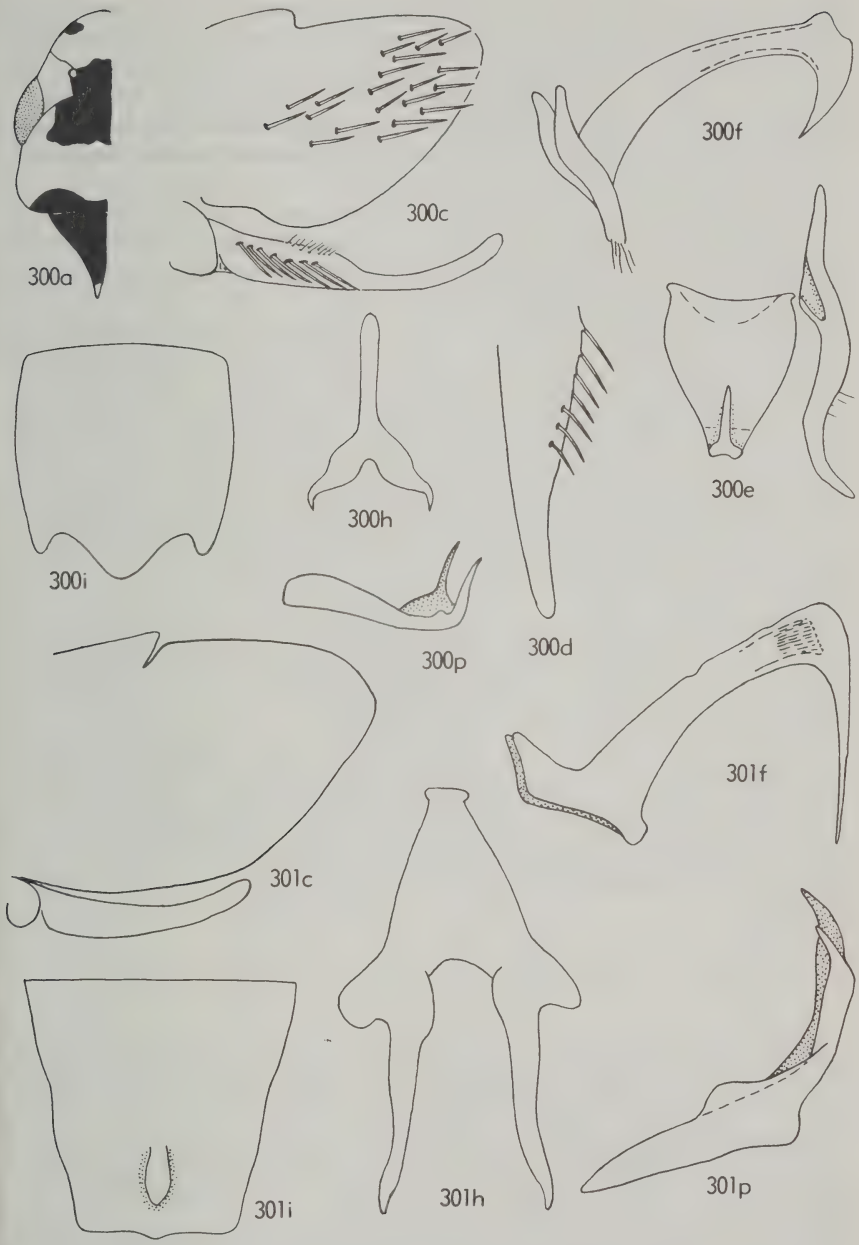
Holotype and 20 additional males, Fontebôa, Amazonas, Brazil (RMS).

S. regalis, n. sp., is the largest species in the genus. It may be separated from other species in the genus by the characters used in the key.

Soosiulus falcifer, NEW SPECIES

FIGURE 301, PAGE 377

Length of male 7.5 mm, of female 7.0-7.3 mm. Head with median length of crown from six-tenths to three-fourths interocular width and from slightly less than four-tenths to slightly less than one-half transocular width, ocelli located slightly behind a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, clypeus with muscle impressions not very distinct. Other external structural characters as in *S. interpolis*, n. sp. Male pygofer with a number of microsetae parallel to and near ventral margin, in addition to discal macrosetae; plates not extending nearly as far posteriorly as pygofer apex, with few (five in holotype) uniseriate macrosetae; style extending posteriorly farther than apex of connective; connective very broad, subquadrate, not keeled; aedeagus symmetrical, shaft very slightly curved and with ventral margin regularly and slightly concave in lateral view, with a ventroapical elongate tapering acute



FIGURES 300, 301.—300, *Soosiulus fabricii* (Metcalf) (specimens from British Guiana): *p,* Paraphyses from lateral view. 301, *S. falcifer,* n. sp. (*i* from specimen from Terr. Amapá, Brazil; remainder from holotype; setae not shown in *c; h* from ventral view): *p,* Paraphyses from lateral view.

process which is more than half the length of shaft; paraphyses with stalk broad, almost as long as rami, with a short lateral lobe on stalk on each side at base of rami, and each ramus with a similar ventral lobe near its base, in lateral view with rami directed posterodorsally through most of their length, abruptly narrowed and extending dorsally at apex. Female abdominal sternum VII with posterior margin rectilinear with a slight median convexity, with an anteapical median convex protuberance.

Head and pronotum marked such as in *S. interpolis,* but with the anterolateral spots of head larger, with the anterior black marking of the pronotum completely bordering anterior pronotal margin behind eyes in male, without a black spot near lateral pronotal margins; scutellum with a sagittate median orange marking; forewing with a spot on each humeral margin, connected by a narrow band along commissural margin with a large transcommissural lenticular marking in clavus, all of which are black; brachial cell black, from near base where the adjacent clavus is also narrowly black, to near apex, the black stripe extending thence posterolaterally to middle apical cell and occasionally also into outer anteapical cell, the connection between brachial cell and dark anteapical marking occasionally wanting and the forewing then having an anteapical spot; membrane black, with (holotype) or without a short narrow black corial stripe parallel to costal margin; most of costal margin broadly bordered with pale orange to translucent amber.

Holotype male and one female, Serro do Navio, Terr. Amapá, Brazil, September 26, 1957 (John Lane), two females, "Rio Anicohi", Terr. Amapá, June 24, 1959 (John Lane) in collection of John Lane. One female Manáos, Brazil and one female, Obidos, Brazil (RMS).

S. falcifer, n. sp., is closely related to *S. azatus,* n. sp. (below) from which it may be distinguished by the much longer apicoventral process of the aedeagus, its paraphyses which are directed more dorsally in lateral view than those of *azatus,* and by the broader, more quadrate connective in *falcifer. S. falcifer* is also closely related to *S. dextrorsus,* n. sp., and *decoris,* n. sp., in the discussions of which distinguishing characters are treated.

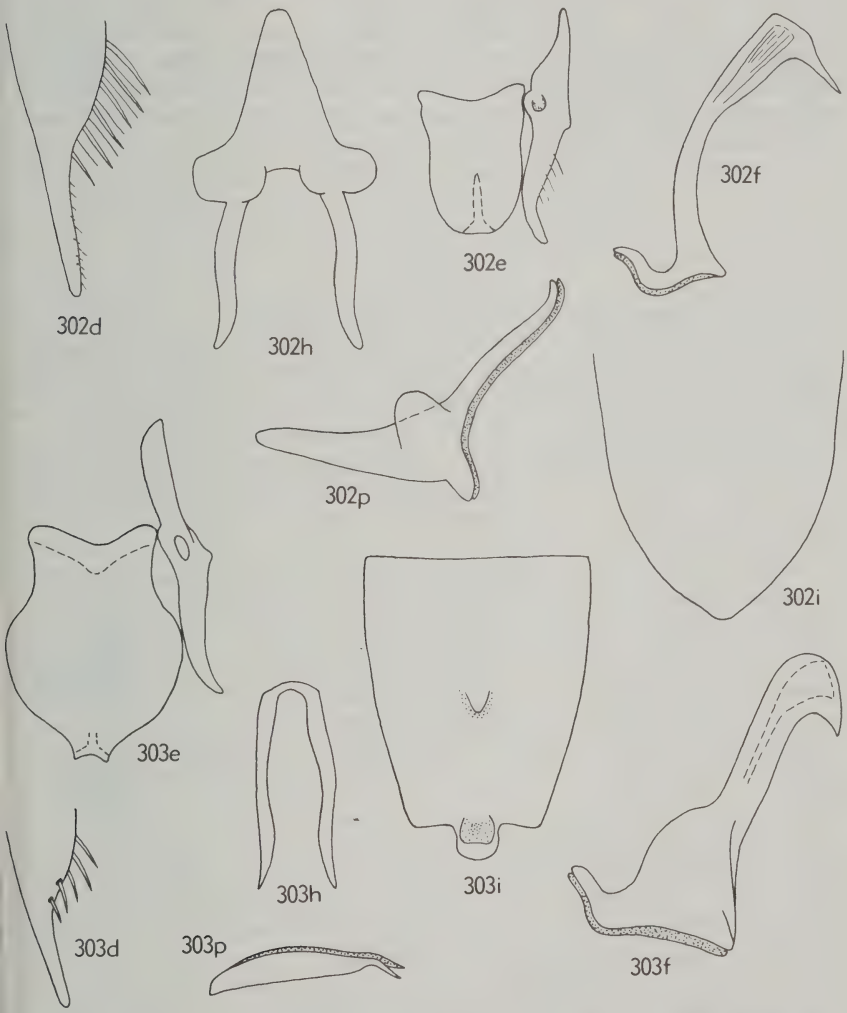
Soosiulus azatus, NEW SPECIES

FIGURE 302, PAGE 379

Length of male 7.3 mm, of female 6.9 mm. Head with median length of crown from seven-tenths to eight-tenths interocular width and from slightly less than one-half to less than six-tenths transocular width, clypeus with muscle impressions not very distinct. Other external structural characters as in *S. interpolis,* n. sp. Male pygofer without microsetae near ventral margin; plates not extending posteriorly nearly as far as pygofer apex, each with a few uniseriate macrosetae on basal half, style extending posteriorly slightly beyond apex of connective; connective elongate, semi-oval, with a median keel in apical half of length; aedeagus symmetrical, with dorsal margin regularly convex and ventral margin irregularly concave in lateral view, with a ventroapical short acute process directed ventrally; paraphyses broadly stalked with lobes as in *S. falcifer,* n. sp., (above) but with lobes at bases of rami more pronounced in

lateral view and with rami directed more nearly posteriorly through most their length and less strongly dorsally at their apices. Female abdominal sternum VII with lateral margins gradually converging to rounded apex.

Color of head, pronotum, and scutellum as in *S. regalis,* n. sp., except that posterior marginal marking of crown is not interrupted medially and transverse sulcus of scutellum is black. Forewings with an arcuate black spot on each humeral margin, not connected with transcommissural claval black



FIGURES 302, 303.—302, *Soosiulus azatus,* n. sp. (*i* from topotype; remainder from holotype; *h* from caudoventral view): *p,* Paraphyses from lateral view. 303, *S. umaritubanus,* n. sp. (*i* from holotype; remainder from specimen from Rio Autaz, Amazonas, Brazil; *h* from ventral view): *p,* Paraphyses from lateral view.

marking which is triangular or lenticular, claval suture with a black stripe which is broader near base, tapering and evanescent apically, with a broader black corial stripe extending from basal third almost to bases of apical cells and connected (holotype) or not with claval suture by a short transverse black marking; membrane and costal margin very narrowly, black.

Holotype male, two females, and one specimen without abdomen, Rio Autaz, Brazil (RMS).

S. azatus, n. sp., is closely related to *S. falcifer*, n. sp., from which the male may be most readily distinguished by its shorter apical aedeagal process and its irregularly concave ventral aedeagal margin in lateral view, and by the slight differences in the paraphyses described above. The abdominal sternum VII of the female is much more convex than in *falcifer* and lacks the anteapical median protuberance found in the latter.

Soosiulus umaritubanus, NEW SPECIES

FIGURE 303, PAGE 379

Length of male 6.9 mm, of female 6.7-7.0 mm. Head with median length of crown from six-tenths to seven-tenths interocular width and slightly more than four-tenths transocular width, ocelli located on a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle; clypeus with muscle impressions not very distinct. Other external structural characters as in *S. interpolis*, n. sp. (p. 374). Male pygofer with a number of microsetae near ventral margin, in addition to discal macrosetae; plates not extending posteriorly nearly as far as pygofer apex, with very few uniseriate macrosetae; style extending posteriorly to a point more than half length of connective; connective broadly expanded in apical two-thirds, with a minute inverted Y-shaped keel at apex; aedeagus symmetrical, shaft nearly straight, rounded dorsally at apex, with an apicoventral short broad acute process; paraphyses not stalked, in lateral view directed posteriorly, abruptly narrowed at apex and with acute tips pointed posteroventrally. Female abdominal sternum VII with posterior margin transversely rectilinear each side of a median convex posterior projection which bears an anteapical depression, with a convex protuberance on midline near midlength.

Color of head and pronotum as in *S. interpolis*, n. sp. (p. 374) except that there are no black spots near lateral pronotal margins; scutellum with basal angles black, usually delimiting a median orange sagittate area; forewings each with a humeral arcuate marking which is narrowly connected along commissural margin with claval transcommissural lenticular claval spot, claval suture narrowly at base, gradually widely near apex, black, and with an anteapical prolongation of the black marking extending posterolaterally into anteapical cells, membrane black; costal margin concolorous with adjoining corium.

Holotype female, and one topotypic female, Umarituba, Amazonas, Brazil, one female, San Gabriel, Amazonas, Brazil, and one male, Rio Autaz, Amazonas, Brazil (RMS).

S. umaritubanus, n. sp., is closely related to *S. klagesi*, n. sp. (p. 390), from which it may be distinguished readily by its apicoventral aedeagal process which is absent in *klagesi*, and from all other species of the genus by the distinctive structure of the female abdominal sternum VII.

Soosiulus dextrorsus, NEW SPECIES

FIGURE 304

Length of male 7.1 mm, of female 7.4-7.5 mm. Head with median length of crown from slightly more than one-half to slightly less than seven-tenths interocular width, and from slightly less than four-tenths to slightly greater than four-tenths transocular width, ocelli located slightly behind a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown. Other external structural characters as in *S. interpolis*, n. sp., (p. 374). Male pygofer with a group of microsetae near posteroventral margin in addition to discal macrosetae, and with three or four enlarged scalelike setae along posterior margin; plates not extending nearly as far posteriorly as pygofer apex, with few uniseriate macrosetae; style extending posteriorly farther than apex of connective; connective semi-oval in form, with a median keel in apical half; aedeagus asymmetrical, shaft slender and tubular, with a long slender acute apical process extending dextrad; paraphyses with a long broad stalk which bears a lateral lobe on each side near base of rami, rami without basal lobes. Female abdominal sternum VII with posterior margin regularly and broadly convex.

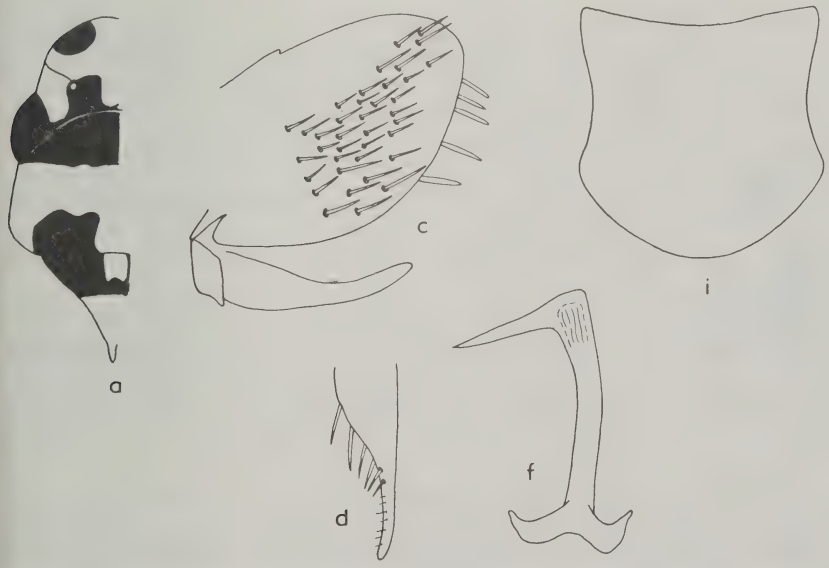


FIGURE 304.—*Soosiulus dextrorsus*, n. sp. (*i* from topotype; remainder from holotype; *f* from dorsal view).

Crown, pronotum, and scutellum with black markings much as in *S. regalis*, n. sp. (p. 376), but posterior paired markings of crown connected in some specimens, with the posterior pronotal markings extending forward farther onto pronotal disk, and with black basal angles of scutellum connected by black transcutellar sulcus; forewing with an arcuate black spot on each humeral margin, not connected with large transcommissural lenticular claval black marking, claval suture bordered broadly at base, more narrowly apically with black, with a longitudinal black stripe in corium extending from basal third almost to base of outer apical cell; membrane and costal margin black, latter bordered with hyaline almost to apex of outer apical cell.

Holotype male, one additional male and two females, Rockstone, British Guiana, February 1-12 (OSU). One female, Mazaruni Head, Pakaraima Mountains, British Guiana, 1932 (J. G. Myers) (BM). One female, Rio Uaupes, Taracuá, Amazonas, Brazil (RMS).

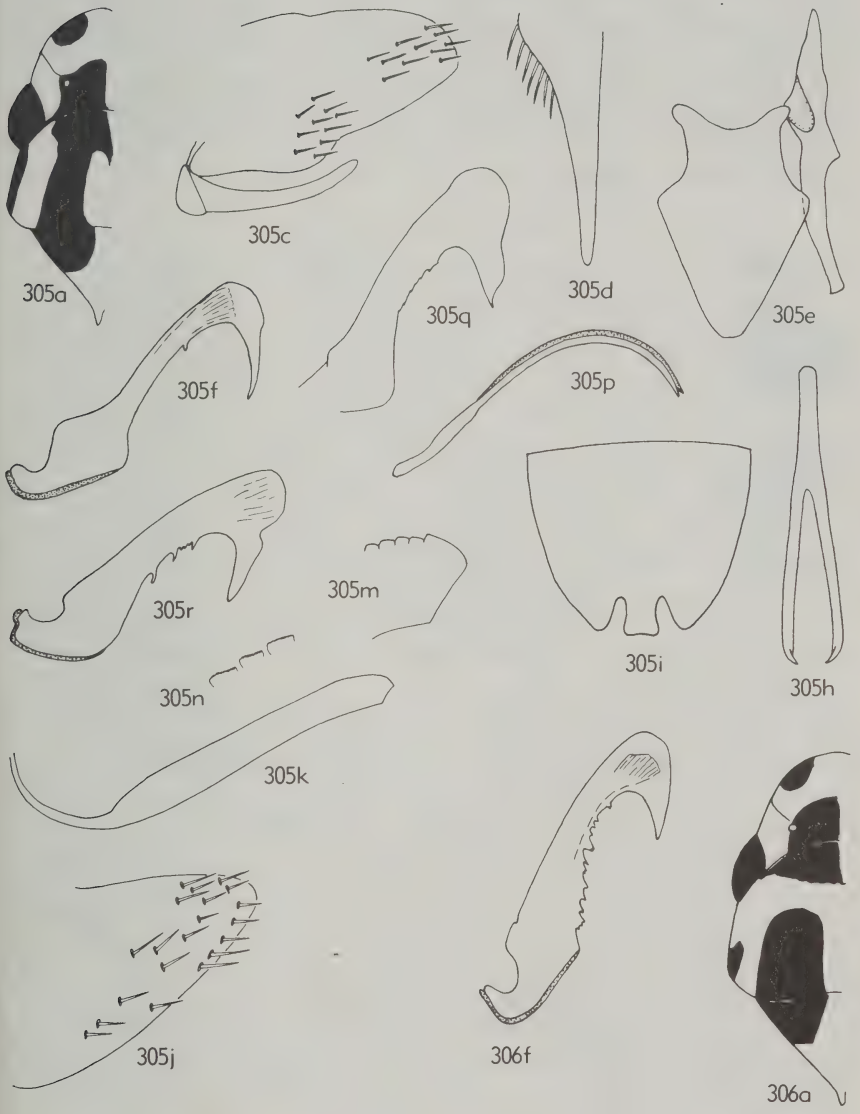
Externally, *S. dextrorsus*, n. sp., is close to *S. azatus*, n. sp., but may be separated from the latter by its paired black markings on the posterior margin of the crown. The male genitalia of *dextrorsus* are most closely related to *S. falcifer*, n. sp. (p. 376) from which it may be distinguished by its asymmetrical aedeagus, its shorter apical aedeagal process, its lack of a convexity at the base of each ramus of the paraphyses, and the presence of the scalelike setae on the posterior margin of its pygofer.

Soosiulus febris, NEW SPECIES

FIGURE 306, PAGE 383

Length of male 7.9-8.0 mm. Head with median length of crown slightly less than six-tenths interocular width and slightly more than one-third transocular width, ocelli located slightly before a line between anterior eye angles, each slightly closer to median line than to adjacent anterior eye angle, clypeus with muscle impressions distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and apical portions of remaining apical cells. Male pygofer with a number of minute microsetae near basiventral margin, in lateral view abruptly narrowed near midlength of posteroventral margin; plates not extending posteriorly nearly as far as pygofer apex, with a few uniseriate macrosetae; style extending posteriorly to a point opposite three-fourths length of connective; connective sagittate in form, not keeled; aedeagus symmetrical, shaft in lateral view broad in basal half, with a broad ventroapical slightly recurved tooth, ventral margin irregularly dentate; paraphyses stalked, in lateral view with rami slender, tapering, acute apically; curved regularly posteriorly and ventrally. Female unknown.

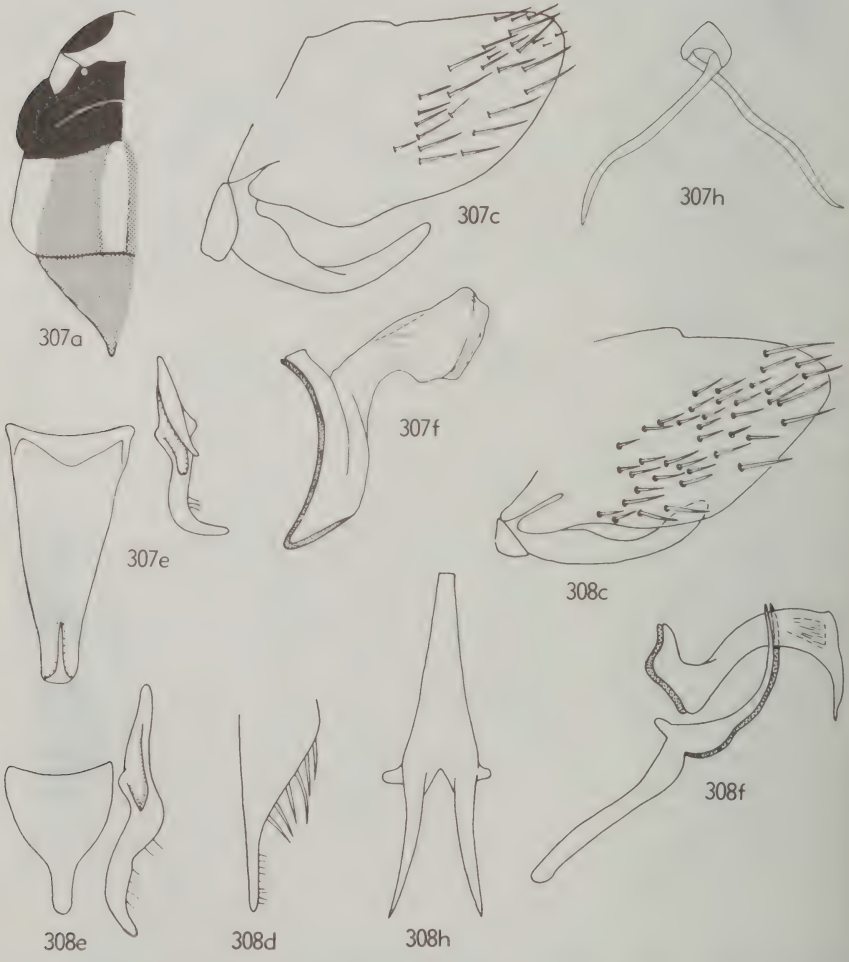
Crown with a pair of marginal rounded black spots behind apex and a median basal black spot which includes ocelli; pronotum with anterior margin broadly bordered with black between eyes, posterior margin with a short narrow black mark near lateral margin on each side and a pair of broader black longitudinal markings extending anteriorly more than half the length of



FIGURES 305, 306.—305, *Soosiulus salutaris* (Fowler) (*i-k, m, n, r,* from specimens from San Isidro del General, Costa Rica; *q* from Costa Rica; remainder from Mojinga Swamp, Panama): *p,* Paraphyses from lateral view; *q, r,* aedeagus from lateral view. 306, *S. febris,* n. sp., holotype.

pronotum, and continuous with black basal angles of scutellum; median orange area of scutellum sagittate; forewing with a black stripe extending along each humeral margin, slightly narrowed behind scutellum, and posteriorly along commissural margin through most of length of clavus, a broad black stripe along claval suture from its base to base of inner apical cell, a shorter black stripe on corium extending from near middle of wing to bases of apical cells, costal margin narrowly black, membrane smoky.

Holotype and two additional males, Colombia, 1942 (L. Richter) (NCS) on indefinite loan to USNM.



FIGURES 307, 308.—307, *Soosiulus trivirgatus* (Fowler) (from specimen from Costa Rica; *h* from dorsal view). 308, *S. decoris*, n. sp., holotype (*h* from dorsal view): *f*, Aedeagus and paraphyses, *in situ*, from lateral view.

S. febris, n. sp., is very closely related to *S. salutaris* (Fowler) and perhaps will be found to be only a subspecies of the latter. *S. febris* is much larger (the length of *salutaris* males varying from 6.0-6.9 mm) and with the head shorter and broader. The male genitalia are like those of *salutaris* in almost every respect. The lateral pronotal markings of *febris* differ from those of *salutaris* in that in the latter the stripe is complete, as are the two wider middle stripes. Also, there is no corial black stripe parallel to the claval sutural black stripe in *salutaris.*

Soosiulus decoris, NEW SPECIES

FIGURE 308, PAGE 384

Length of male 7.9 mm. Head with median length of crown approximately three-fourths interocular width and slightly less than one-half transocular width, ocelli located on a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, clypeus with muscle impressions not very distinct. Other external structural characters as in *S. interpolis,* n. sp. (p. 374). Male pygofer without microsetae near ventral margin; plates not extending nearly as far posteriorly as pygofer apex, each with a few uniseriate macrosetae; style extending posteriorly slightly farther than apex of connective; connective abruptly narrowed anteapically, not keeled; aedeagus symmetrical, regularly curved in lateral view, with ventral margin regularly and deeply concave, apex with an apicoventral elongate slender acute process; paraphyses with a slender elongate stalk, and with a small lateral convexity at base of rami which are crescentiform in lateral view, abruptly narrowed in their basal third with their apices directed anterodorsally.

Markings of head and pronotum as in *S. azatus,* n. sp. (p. 378); scutellum with basal angles black (remainder obscured by pin); forewing with a black spot on humeral margin, connected by a very narrow black line along commissural margin to a small lenticular transcommissural claval black spot, claval suture broadly bordered with black almost to apex and with a subparallel black line in corium extending into anteapical cells, membrane and costal margin black, anteapical area suffused with dark red.

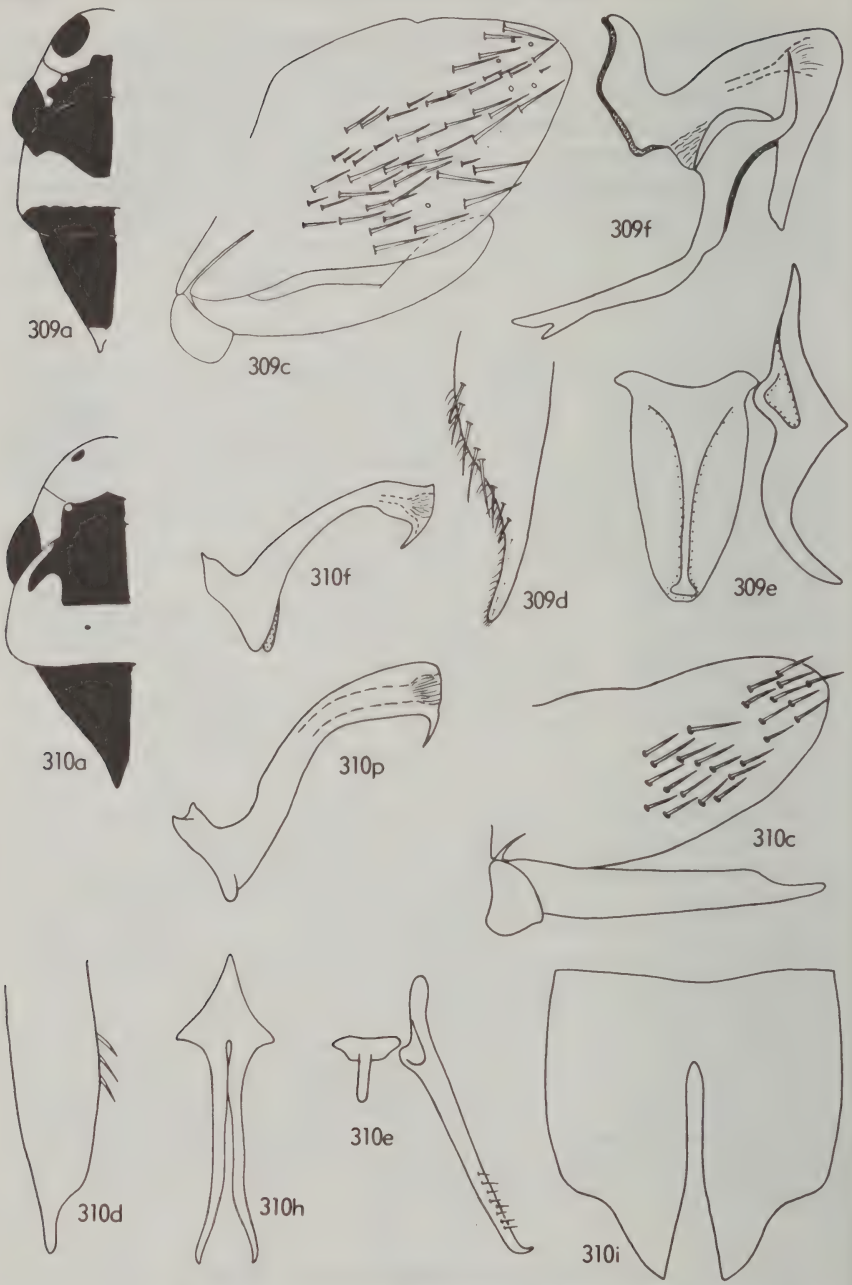
Holotype male, Pachitea, Peru (RMS).

S. decoris, n. sp., is closely related to *S. falcifer,* n. sp. (p. 376) and to *S. azatus,* n. sp. (p. 378), from both of which it may be separated by the narrower stalk of the paraphyses, the smoothly curved crescentiform rami of the paraphyses in lateral view, and by the abruptly narrowed connective. The aedeagus is more regularly concave on its ventral margin than in *azatus* and the apical process is shorter than in *falcifer.*

Soosiulus maroniensis, NEW SPECIES

FIGURE 309, PAGE 386

Length of male 8.7-9.1 mm. Head with median length of crown from slightly less than six-tenths to almost seven-tenths interocular width and from



FIGURES 309, 310.—309, *Soosiulus maroniensis,* n. sp. (from specimen from French Guiana); *f,* Aedeagus and paraphyses from lateral view). 310, *S. servulus* (Melichar) (*e, f, h,* from lectotype; *i* from specimen from French Guiana; remainder from Dutch Guiana; *h* from dorsal view).

slightly less than four-tenths to slightly less than one-half transocular width, ocelli located on a line between anterior eye angles, each slightly closer to adjacent eye angle than to median line of crown, clypeus with muscle impressions not very distinct. Forewing with membrane including inner apical cell and apical portions of remaining apical cells. Other external structural characters as in *S. interpolis,* n. sp. (p. 374). Male pygofer with extremely minute microsetae near ventral margin; plates not extending posteriorly nearly as far as pygofer apex, each with approximately six uniseriate macrosetae; style extending posteriorly as far as apex of connective; connective elongate semi-oval in form with a median keel throughout its length; aedeagus symmetrical, in lateral view with shaft broad, its ventral margin very strongly concave, rounded dorsoapically, with an apicoventral process extending ventrally and obliquely truncate at apex; paraphyses with a long very slender stalk, in lateral view each ramus slender, biundulate, acute apically, the apices directed dorsally, without a convexity at apex of stalk or at bases of rami. Female unknown.

Crown yellow tinged with orange, with a pair of large marginal black spots behind apex, and an irregularly margined black spot at base extending anteriorly before ocelli; pronotum black with a transverse yellow band which is constricted at middle; scutellum black except orange apex; forewings dull orange, with a small lenticular transcommissural claval spot, claval suture and costal margin narrowly, and membrane, black, anteapical portion of wing suffused with dark red.

Holotype male, Maroni River, French Guiana and two additional males, St. Jean, Maroni River, French Guiana (NCS). Holotype on indefinite loan to USNM.

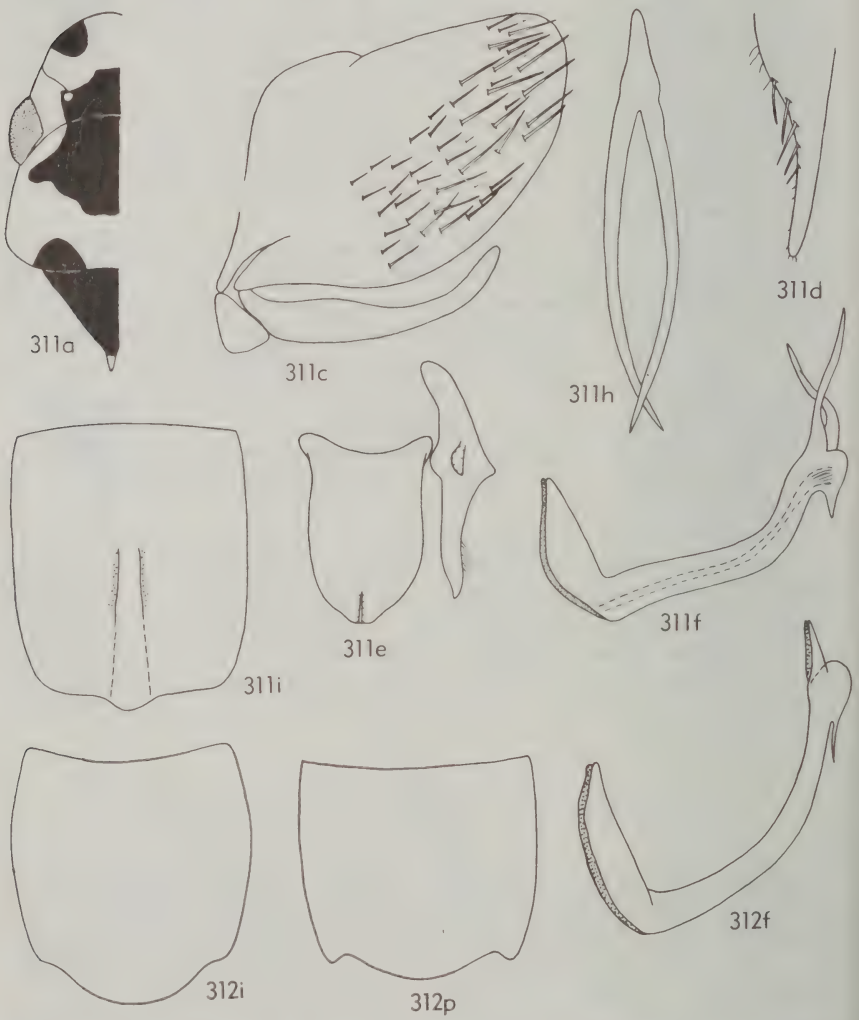
S. maroniensis, n. sp., is apparently related to *S. decoris,* n. sp. (above), but may be readily separated from the latter by its broader aedeagal shaft in lateral view, its broader apicoventral aedeagal process, and the biundulate rami of its paraphyses in lateral view. *S. maroniensis* can be recognized externally because of its large size, the large amount of black on the anterior dorsum and the scarcity of black markings on the forewings (see description above).

Soosiulus hastatus, NEW SPECIES

FIGURE 311, PAGE 388

Length of male 7.0 mm, of female 7.0-7.3 mm. Head with median length of crown from slightly more than one-half to slightly more than six-tenths interocular width and from slightly more than one-third to more than four-tenths transocular width, ocelli located slightly before a line between anterior eye angles, slightly variable as to relative distance from anterior eye angle and median line, clypeus with muscle impressions not very distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and apical portions of remaining apical cells. Male pygofer with a number of extremely minute microsetae near

ventral margin; plates not extending posteriorly as far as pygofer apex, with few uniseriate macrosetae; style extending posteriorly almost as far as apex of connective; connective elongate semi-oval in form, with a very short median keel at apex; aedeagus asymmetrical, cylindrical, tapering gradually, and extending posteriorly in basal two-thirds, apical one-third directed posterodorsally, with a pair of anteapical dorsal processes extending dorsally and not symmetrical, with a ventroapical short acute unpaired process; paraphyses



FIGURES 311, 312.—311, *Soosiulus hastatus*, n. sp. (*i* from topotype; remainder from holotype; *h* from dorsal view). 312, *S. ruber*, n. sp. (*f* from holotype; *i* from topotype; *p* from specimen from Fontebõa, Amazonas, Brazil): *p*, Female abdominal sternum VII.

short-stalked, each of the rami long, slender, tapered, acute apically. Female abdominal sternum VII with posterior margin transverse or shallowly concave and with slight median convexity, with a midventral longitudinal elevated area extending basally through more than apical half.

Markings of crown, pronotum, and scutellum as in *S. interpolis,* n. sp. (p. 374), but lacking small spot on each side of pronotum near lateral margin; forewings each with an angular or linear spot on humeral margin, connected by a narrow black marking along commissural margin with a transcommissural hastate or elongate-triangular claval black spot, claval suture narrowly, and membrane, black.

Holotype male and one female, "Santarem", Brazil; two females and one specimen without abdomen, "Para", Brazil (USNM). One female, Villa Braga, Brazil (CM). One female, lower Amazon (RMS).

S. hastatus, n. sp., may be distinguished from other species, except *S. ruber,* n. sp., by its paired dorsal aedeagal processes and from *ruber* by the asymmetry of these processes and by the broader ventroapical process than in *ruber.* The females differ from *ruber* females by the more nearly rectilinear or slightly concave posterior margin of sternum VII in *hastatus.*

Soosiulus ruber, NEW SPECIES

FIGURE 312, PAGE 388

Length of male 7.0-7.6 mm, of female 6.7-7.2 mm. Head with median length of crown from six-tenths to seven-tenths interocular width and from one-third to almost one-half transocular width, ocelli located before a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, clypeus with muscle impressions not very distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and apical portions of remaining apical cells. Male with aedeagus symmetrical, shaft regularly curved posterodorsally in lateral view, with a pair of erect tapering acute anteapical processes and a very slender acute retrorse ventroapical process; other male genital characters as in *S. hastatus,* n. sp. Female abdominal sternum VII with most of posterior margin regularly, broadly convex.

Color of crown, pronotum, and scutellum as in *S. interpolis,* n. sp. (p. 374), except that there is no small spot on each side of pronotum near lateral margin and that pale area of scutellum is more extensive, occasionally occurring as a median sagittate pale marking; forewing with claval black markings as in *S. hastatus,* n. sp., except that the transcommissural spot is not hastate in any of the specimens at hand; corium with a single black stripe of variable width, either narrow at base, extending posteriorly along and broadening almost to apex of claval suture, thence narrowing slightly and extending to central anteapical portion of corium (type), or narrow throughout its length and extending as in specimens with the broader stripe, membrane black.

Holotype male, Benevides, Pará, Brazil, (Gounelle), February, 1895, one topotypic female; two females and one specimen without abdomen, Pará, Brazil (MHNP). One male and one female, Pará, Brazil (MMB). Four females, Fontebõa and two females, Teffé, NW. Brazil, and one female, Yurimaguas, Peru (RMS). One female, Pará, Brazil (USNM).

S. ruber, n. sp., is closely related to *S. hastatus*, n. sp., in the discussion of which distinguishing characters are treated. I am not certain that the females from Yurimaguas and the upper Amazon Valley are conspecific with the (typical) specimens from Pará. They differ only in that the posterior margin of abdominal sternum VII is less convex and the elongate stripe of the forewing is narrower than in the typical form.

Soosiulus klagesi, NEW SPECIES

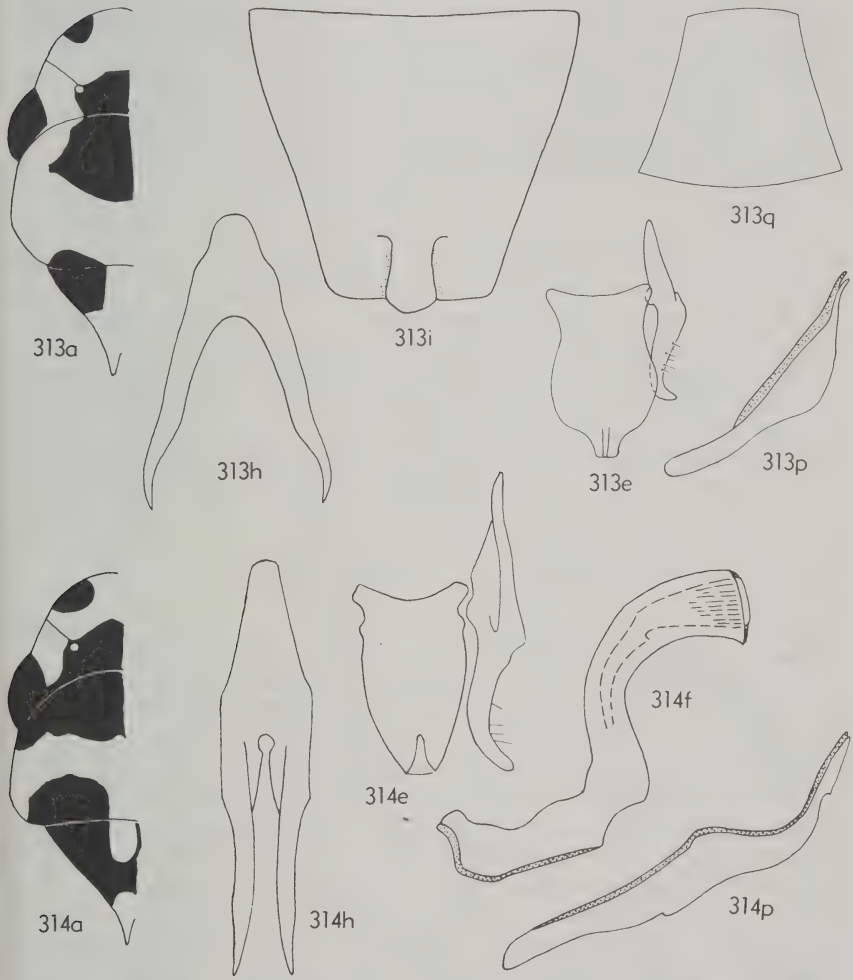
FIGURE 313, PAGE 391

Length of male 7.3-8.0 mm, of female 7.2-7.7 mm. Head with median length of crown from slightly less than six-tenths to almost seven-tenths interocular width and from slightly less than four-tenths to almost one-half transocular width, ocelli located before a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, clypeus with muscle impressions distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and apical portions of remaining apical cells. Male pygofer with a small group of very minute microsetae near basiventral margin; plates not extending nearly as far posteriorly as pygofer apex, each with approximately six uniseriate macrosetae; style extending posteriorly to a point more than one-half length of connective; connective slightly constricted near base and abruptly narrowed anteapically, with a median keel in apical one-fifth of length, aedeagus symmetrical, shaft abruptly narrowed in basal third in ventral view, in lateral view regularly arched with apex directed posteroventrally, completely without processes, paraphyses with a very short stalk, in lateral view with each of rami broadest at midlength, gradually tapered and acute in its apical half. Female abdominal sternum VII with a median convexity extending to apical margin, its apex convex, posterior margin on each side transverse and rectilinear.

Color of crown and pronotum as in *S. hastatus*, n. sp. (p. 387), the orange marking of the scutellum forming a median sagittate area; forewings with humeral margins each bearing a narrow angular black spot which is connected narrowly along commissural margin with a transcommissural lenticular claval black spot, with a stripe on claval suture, broadening apically and abruptly narrowing at apex, the membrane, a spot in anteapical cells (occasionally connected with claval suture stripe), black.

Holotype male, six additional males and one female, Santarém, Brazil, June, 1919 (S. M. Klages); one male, Villa Braga, Brazil, December, 1919 (CM). One female, Itaituba, "Peru" (!) (MMB). One female, "Amazon" (HNHM). One male, Itaituba, Brazil (RMS).

S. klagesi, n. sp., is most closely related to *S. solidus* (Melichar) (fig. 314), from which the males may be distinguished by the shorter stalk of the paraphyses, the rami of the paraphyses which are not broadest at midlength and are notched anteapically in *solidus*, and by the shorter styles in relation to the connective in *klagesi*. The females of *solidus* do not have a broad median convexity on abdominal sternum VII. Both sexes of *klagesi* can be separated externally from *solidus* by the dark anterior pronotal dark marking which does



FIGURES 313, 314.—313, *Soosiulus klagesi*, n. sp. (*a*, *i*, *q*, from topotypes; remainder from holotype; *h* from dorsal view): *p*, Paraphyses, from lateral view; *q*, dorsal sclerite of female genital chamber from dorsal view. 314, *S. solidus* (Melichar) (specimen from Itaituba, Brazil; *h* from ventral view): *p*, Paraphyses from lateral view.

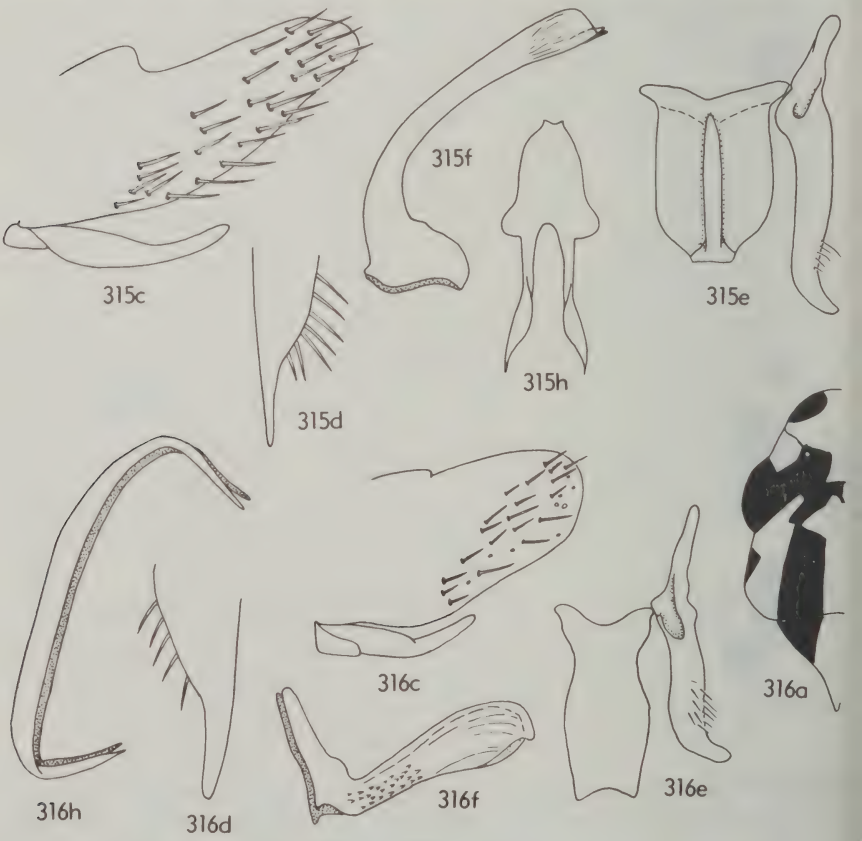
not extend from eye to eye in *klagesi*, and in that there is only a single black stripe on the forewing of *klagesi* instead of the two that are found in *solidus*.

S. klagesi, n. sp., is named in honor of the collector of the holotype.

Soosiulus lunatus, NEW SPECIES

FIGURE 315

Length of male 7.3-7.5 mm. Head with median length of crown from slightly less than seven-tenths to more than eight-tenths interocular width and from slightly more than four-tenths to one-half transocular width, ocelli located variably with relation to line between anterior eye angles, and relative distance to adjacent anterior eye angle and median line of crown; clypeus with muscle impressions not very distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and apical portions of second and third apical cells.



FIGURES 315, 316.—315, *Soosiulus lunatus*, n. sp., holotype (*h* from dorsal view). 316, *S. fucatus*, n. sp., holotype (*h* from lateral view).

Male pygofer unusually slender for the genus, with group of very minute microsetae near basiventral margin; plates not extending nearly as far posteriorly as pygofer apex, each with a few uniseriate macrosetae; style extending posteriorly beyond apex of connective; connective elongate semi-oval in form, with a median full-length keel; aedeagus symmetrical with shaft slender and elongate for the genus, curved gradually downward, with a pair of short ventroapical processes extending parallel to long axis of apical portion of shaft; paraphyses broadly stalked with a lateral lobe before base of each ramus, rami slender, broadest in apical half, thence tapering strongly to acute apices. Female unknown.

Crown, pronotum, and scutellum marked as *S. sermunculus* (Melichar) (fig. 297*a*); forewing with an angular black spot bordering each humeral margin, connected very narrowly with transcommissural hastate claval black area which extends almost to apex, a second equally broad longitudinal stripe arising in basal third of corium, extending almost to base of outer apical cell, costal margin and membrane, black.

Holotype male, San Antonio, Loreto Province, Peru, August 23, 1965 (J. C. Hitchcock, Jr.) and one male topotype with same data except date which is August 20, 1965 (USNM). One male, Fonteböa, Amazonas, Brazil (RMS).

S. lunatus, n. sp., appears to be closely related to *S. sermunculus* (Melichar) from which it is indistinguishable externally. I have not been able to distinguish females of this species from *sermunculus*. The males may be separated by the paraphyses which have a longer, broader stalk than in *sermunculus* and by the aedeagus which is longer and more regularly curved than in *sermunculus*. The apical aedeagal processes, in *lunatus,* are not directed at an angle to the long axis of the aedeagal shaft.

Soosiulus fucatus, NEW SPECIES

FIGURE 316, PAGE 392

Length of male 6.4 mm. Head with median length of crown seven-tenths interocular width and slightly more than four-tenths transocular width, ocelli located slightly before a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line; clypeus with muscle impressions distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and most of remaining apical cells. Male pygofer without microsetae; plates not extending nearly as far posteriorly as pygofer apex, each with very few uniseriate macrosetae; style extending posteriorly as far as apex of connective; connective subquadrate, slightly narrowed in basal half, without a keel; aedeagus symmetrical, almost straight, gradually expanded in apical half, without processes, gonopore subapical and ventral; paraphyses without a stalk, with a transverse basal connection, each ramus consisting of a ventral short slender acute process and a dorsal much longer, slender, tapered portion which is decurved apically. Female unknown.

Crown with pair of anteapical marginal spots and a pair of basal large quadrate marginal spots extending forward as far as ocelli and from inner eye

margins almost to midline, black; pronotum with a pair of longitudinal lines, interrupted (holotype) or nearly so in anterior half, and a small spot near middle of each lateral margin, black; scutellum with basal angles black; forewings with inner margins of clavi black-bordered almost to their apices, a black stripe beginning in outer basal angle of each clavus, crossing claval suture near midlength and extending into anteapical cells, thence curved laterally to costal margin; costal margin narrowly, and membrane, black; clypeus with an elongate median black spot.

Holotype male and one additional male, Cairo, Costa Rica, March 22-26, 1932 (Sofia and C. H. Ballou) (NCS). One female, Musawas, Waspuc River, Nicaragua, October 13, 1955 (B. Malkin) (UCAL). Holotype on indefinite loan to USNM.

S. fucatus, n. sp., may be separated from all other species in the genus by its lack of an angular spot on the humeral margin of the forewing, by the presence of a black spot on the clypeus, by the form of the paraphyses, and of the aedeagus.

Soosiulus fulgidus, NEW SPECIES

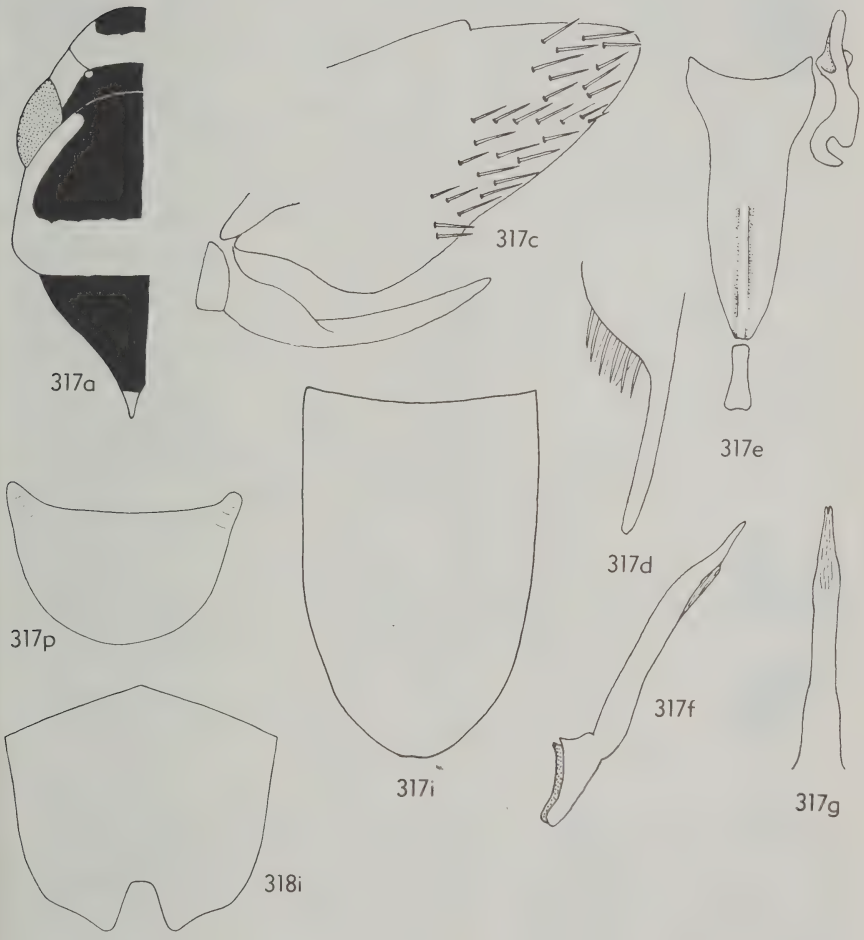
FIGURE 317

Length of male 8.0 mm, of female 8-3-8.4 mm. Head with median length of crown one-half or slightly less than one-half interocular width and approximately three-tenths transocular width, ocelli located before a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown; clypeus with muscle impressions distinct. Thorax with pronotal width approximately equal to transocular width of head. Male pygofer narrower apically than in most species in the genus, with a large number of microsetae along basiventral margin; plates not extending nearly as far posteriorly as pygofer apex, with very few uniseriate macrosetae; style extending posteriorly to a point much less than half length of connective, with distinct preapical lobe; connective very elongate, slightly narrowed in basal third, thence tapering gradually to rounded apex; aedeagus symmetrical, almost straight, ventral and dorsal margins subparallel, the ventral margin very slightly concave in lateral view, apex abruptly narrowed and subacute, without aedeagal processes; paraphysis consisting of very short median longitudinal bar at apex of connective. Female abdominal sternum VII elongate and with posterior margin produced and regularly convex except medially where it is very slightly concave.

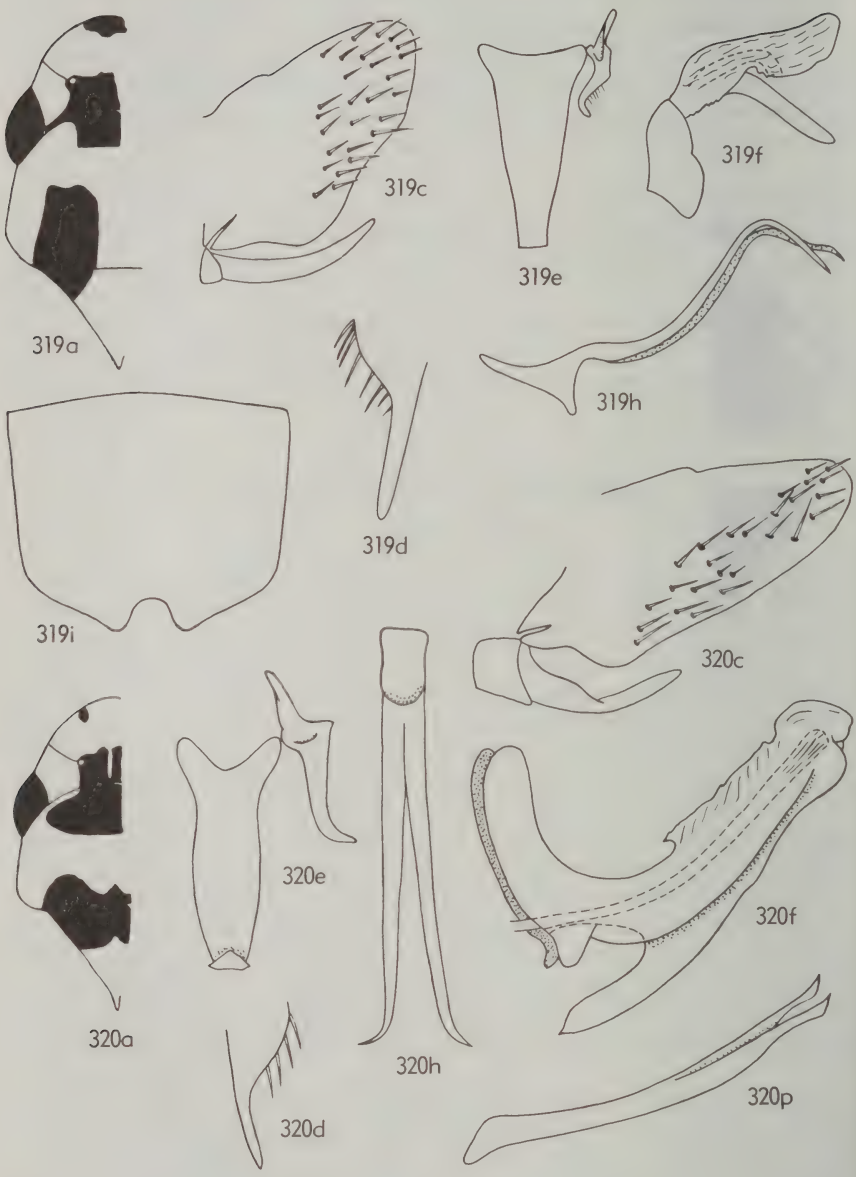
Crown with a basal black marking extending from eye to eye including ocelli, and a median apical black spot; disk of pronotum black, broadly margined with orange laterally and posteriorly, scutellum black except orange apex; forewing orange with an angular spot on humeral margin, an elongate angular marking occupying most of clavus, a longitudinal marking beginning in basal third of corium and extending almost to base of apical cells, and costal margin narrowly, black; face with apical spot of crown continued ventrally as a broad median black spot on clypeus.

Holotype male and one female, Colombia, 1942 (L. Richter), one female, Bogotá, Colombia (L. Richter) (NCS). One female, "Buonavista, Ost. Cord." (MMB). Holotype on indefinite loan to USNM.

S. fulgidus, n. sp., may be distinguished from other species of the genus by the slender acute aedeagus of the male, and externally by the orange commissural margins of the clavus and by the markings of the head.



FIGURES 317, 318.—317, *Soosiulus fulgidus,* n. sp. (*i, p,* from topotype; remainder from holotype; *e* showing paraphysis; only aedeagal shaft shown in *g*): *p,* Lightly sclerotized sclerite of female genital chamber from dorsal view. 318, *S. comitatulus* (Melichar), lectotype.



FIGURES 319, 320.—319, *Soosiulus flammidulus* (Jacobi) (*a* from specimen from Marcapata, Peru; *i* from Peru; remainder from lectotype; *h* from lateral view). 320, *S. mirus,* n. sp., holotype (*h* from dorsal view): *p,* Paraphyses from lateral view.

Soosiulus mirus, NEW SPECIES

FIGURE 320, PAGE 396

Length of male 7.0 mm. Head with median length of crown seven-tenths interocular width and slightly less than one-half transocular width, ocelli located before a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, clypeus with muscle impressions distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and apical portions of remaining apical cells. Male pygofer with few very minute microsetae near basiventral margin; plates not extending nearly as far posteriorly as pygofer apex, each with few uniseriate macrosetae; style extending posteriorly to a point less than one-half length of connective; connective elongate, Y-shaped with stem longer than arms, slightly narrowed in basal third, slightly expanded in apical half and gradually narrowed to truncate apex, with an apical keel; aedeagus symmetrical, with an unpaired retrorse ventral process diverging from shaft near base of latter and abruptly narrowed and acute apically; paraphyses very short-stalked, each of rami slender and gradually tapered in dorsal view, in lateral view each abruptly narrowed in apical third and obliquely truncate at apex.

Head and pronotum with black markings much as in *S. fabricii* (Metcalf) (fig. 300*a*), except that posterior marking of crown is interrupted medially; scutellum black in basal half; forewings each with a diagonal black stripe in clavus including most of humeral and more than one-half of commissural margins, corium with a black stripe arising at wing base, extending parallel to brachial cell to claval apex thence posterolaterally to bases of apical cells, costal margin narrowly, and membrane, black.

Holotype male, "Peru" (OSU).

S. mirus, n. sp., is distinct from other species of the genus except *S. flammidulus* (Jacobi) in its unpaired aedeagal process that arises basiventrally. It differs from *flammidulus* in the markings of the anterior dorsum, the shape of the paraphyses, and in that its aedeagal process is retrorse.

Soosiulus facis, NEW SPECIES

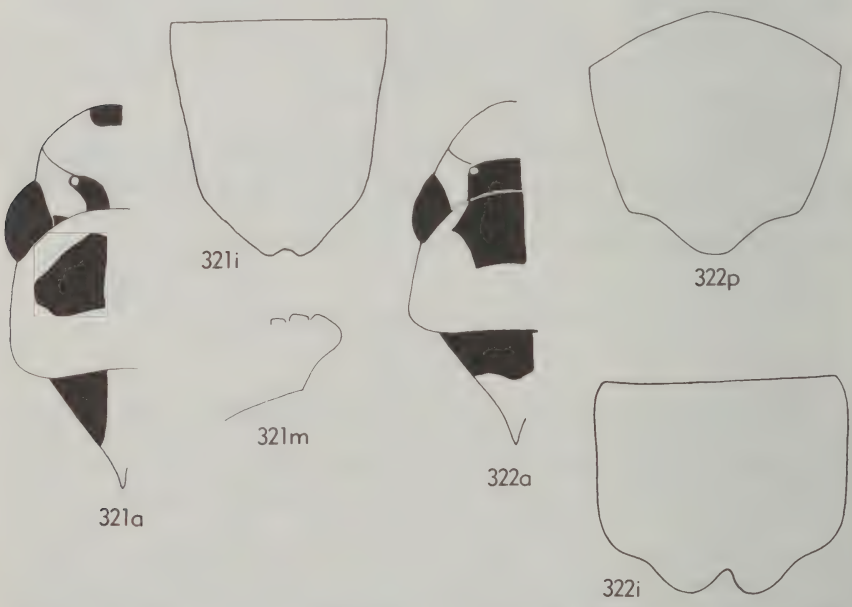
FIGURE 321, PAGE 398

Length of female 7.0-7.5 mm. Head with median length of crown approximately six-tenths interocular width and from one-third to slightly less than four-tenths transocular width, ocelli located before a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, clypeus with muscle impressions distinct. Thorax with pronotal width approximately equal to transocular width of head; forewing with membrane including inner apical cell and apical portions of remaining apical cells. Male unknown. Female abdominal sternum VII with posterior margin gradually and moderately produced, concavely and shallowly emarginate at apex.

Crown and pronotum with following black markings: a median apical spot, an arcuate basal spot arising on basal margin and extending to ocellus on each side, a very small marginal spot next inner margin of each eye, on crown; a pair of polygonal spots on anterior two-thirds of disk, on pronotum; scutellum black with a median orange stripe; forewing with a rounded humeral marginal black spot that is narrowed posteriorly and extends a very short distance along commissural margin, clavus with an elongate triangular black marking bordering and continuous posteriorly with smoky wing membrane, corium with an elongate black stripe which is gradually broadened in its basal two-thirds, gradually narrowed posteriorly and extending to bases of apical cells, costal margin narrowly black; face with apical black spot extending a short distance onto clypeus.

Holotype female, Maroni River, French Guiana (Le Moult) on indefinite loan to USNM from NCS. One female from near Mazaruni Head, Pakaraima Mts., British Guiana, 1932 (J. G. Myers) (BM).

S. facis, n. sp., is similar to *S. flammidulus* (Jacobi) in the form of the female abdominal sternum VII, but this structure is more elongate, more tapered, and with the apical emargination less pronounced in *facis*. Also, *facis* can be distinguished from *flammidulus* by its much less extensive black markings on the posterior portion of the crown, by the difference in the pronotal black markings which do not touch the posterior margin in *facis*, and by the more extensive black markings of the scutellum in *facis*.



FIGURES 321, 322.—321, *Soosiulus facis*, n. sp., holotype. 322, *S. velocissimus* (Melichar) (*p* from holotype; *a*, *i*, from "Provincia del Sara", Bolivia): *p*, Female abdominal sternum VII from ventral view.

55. Genus **IRAGUA** Melichar

Figures 323-332

Eugonia Melichar, 1926a:342. Type-species: *Tettigonia diversa* Signoret, by subsequent designation of China, 1938d:183 (preoccupied).

Iragua Melichar, 1926a:342. Type-species: *Tettigonia diversa* Signoret, by present designation.

Eugonalia Evans, 1947a:161 (new name for *Eugonia* Melichar). New synonymy.

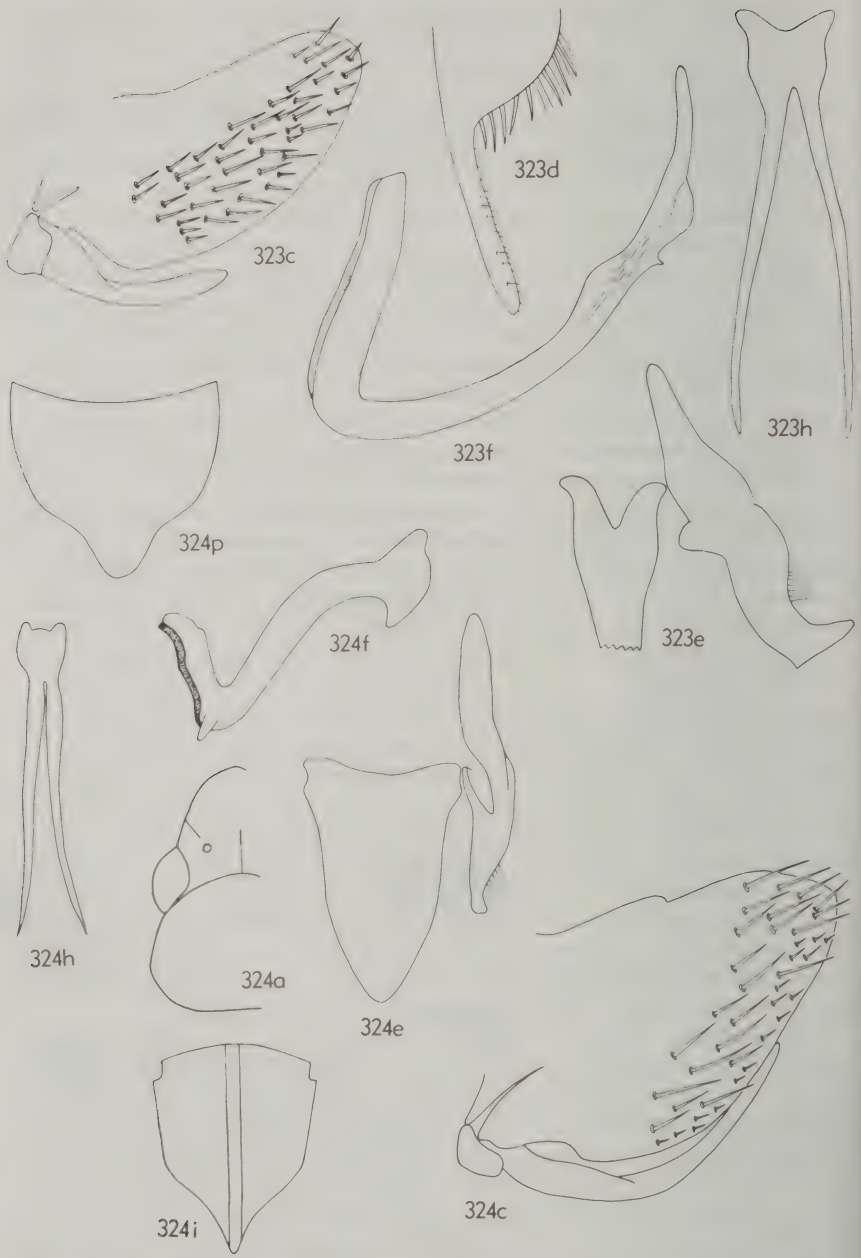
Length 7.7-12.0 mm.

Head well produced, median length of crown varying from six-tenths of, to equal to, interocular width, and from four-tenths to slightly more than six-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle, crown with a median longitudinal fovea, lateral clypeal sutures extending onto crown and attaining ocelli, antennal ledges not protuberant, in lateral view with anterior margins oblique and rectilinear or slightly convex; clypeus convex except medially where it is slightly or distinctly (*I. flammea* (Signoret)) flattened, muscle impressions not very distinct, face without pubescence, transclypeal suture obscure medially, clypellus not produced, but with profile of its lower portion more nearly horizontal than contour of its basal portion.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin varying intraspecifically from slightly concave to slightly convex, disk with or without transverse rugae, not pubescent; scutellum usually not striate behind transverse sulcus. Forewing broadened apically, with a membrane, veins usually distinct and elevated, with four apical cells of which all but inner are of almost same length, second apical cell not strongly narrowed apically (exception: *I. perplexa,* n. sp.), without an apical plexus of veins, texture varying from mostly hyaline to opaque and mostly coriaceous, apical margin slightly concave; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first hind tarsomere slightly greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin regularly convex, with a number of macrosetae arising irregularly over most of disk, or limited to its posterior half, pygofer without processes (exceptions: *I. circulifera* (Taschenberg) and *perplexa.*) Plates triangular, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae. Style extending posteriorly to a variable degree interspecifically compared with posterior extent of connective, without a preapical lobe, apex variable interspecifically, but not acute. Connective varying interspecifically. Aedeagus symmetrical, variable interspecifically but without processes arising at base (exception: one specimen of *circulifera* with a median basiventral process). Paraphyses symmetrical with rami slender, tapering, and acute.

Female abdominal sternum VII from slightly to strongly produced posteriorly, posterior margin varying interspecifically from slightly convex to



FIGURES 323, 324.—323, *Iragua estella* (Distant) (from topotype). 324, *I. flammea* (Signoret) (*a, i,* from lectotype; *p* from specimens from Maroni River, French Guiana; *h* from ventral view; *i* not macerated): *p,* Female abdominal sternum VII from macerated specimen.

acutangular, and with or without emarginations, keeled medially or not. Ovipositor second valvula with broad portion bearing numerous rounded quadrate teeth, each of which bears small secondaries, with a short denticulate anteapical and a longer denticulate area below the bluntly rounded dorsally-located apex. Pygofer with a number of irregularly arranged anteapical macrosetae.

Eugonia Melichar has line priority over *Iragua*. *Iragua* has never had a valid specific name associated with it, Evans' (1947a:162) designation of *I. conjuncta* being a *nomen nudum,* and a manuscript name of Melichar, and represented only by females in the Melichar collection in Brno. Melichar also included the species described below as *Iragua perplexa,* n. sp., represented by males. These are congeneric with *Tettigonia diversa* Signoret which was chosen (above) as type-species of *Iragua* to obviate future confusion.

The genus *Iragua* Melichar is similar in many features to *Ladoffa,* new genus, to which it is probably closely related. Species of *Iragua* are less strikingly marked than those of *Ladoffa,* and all are larger than species of *Ladoffa* except *I. circulifera* (Taschenberg). The second apical cell of the forewing is not strongly narrowed apically, as it is in *Ladoffa* (exception: *I. perplexa,* n. sp.) and the forewing is broader in its apical half (exception: *circulifera*) than in *Ladoffa*. The anteapical angle on the mesal margin of the style frequently found in *Iragua* does not occur in *Ladoffa*. *Iragua* is similar in appearance to *Diedrocephala* Spinola, but is readily separated from the latter by its symmetrical paraphyses in the male, its lack of a carina at transition from crown to face, the occurrence of four apical cells in the forewing, and the produced sternum VII of the female (emarginate in *Diedrocephala*).

The known range of *Iragua* Melichar is from Costa Rica to Bolivia, Trinidad, Venezuela, and northwest Brazil. Species vary in color from very dark to orange or pale yellow.

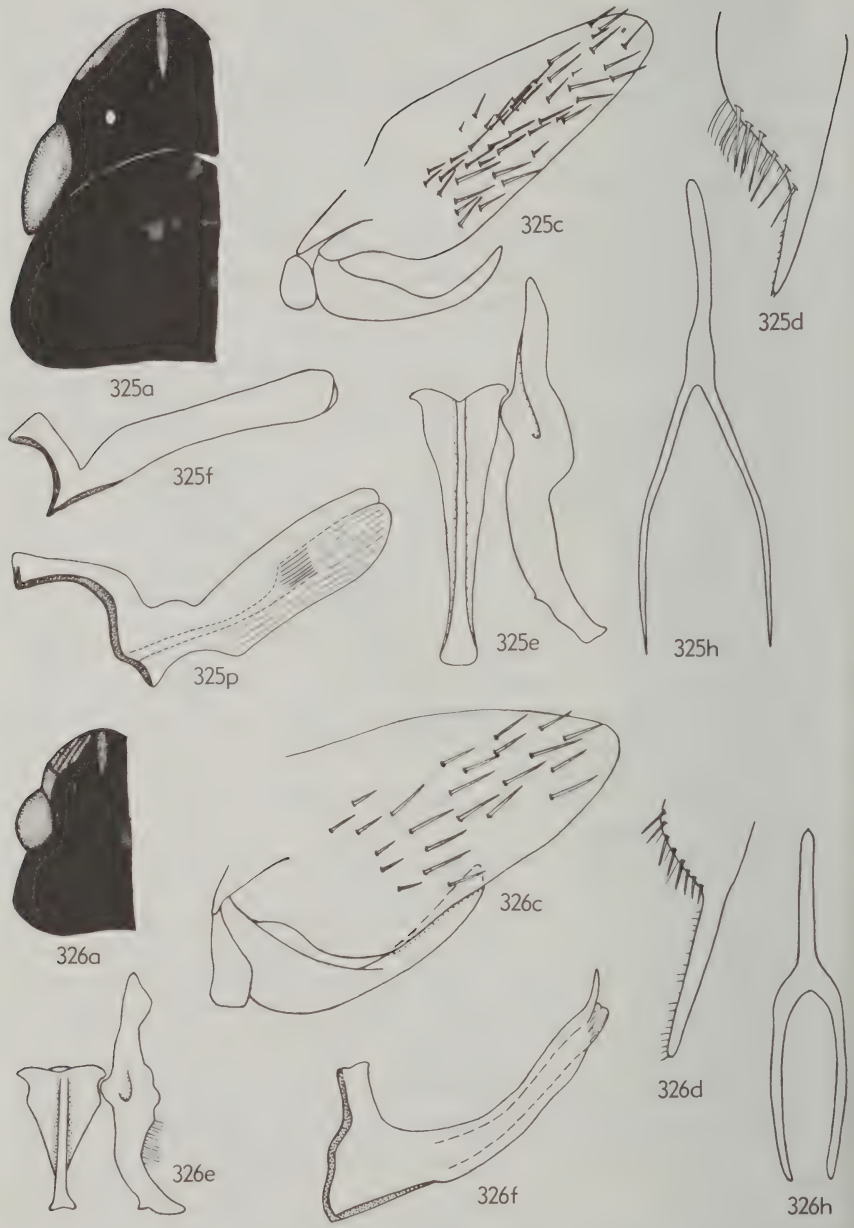
My interpretation of *Tettigonia circulifera* (Taschenberg) is based on an examination of the holotype.

I found no specimens, in the Signoret collection in Vienna, suitable for a lectotype of *Tettigonia diversa* Signoret, nor did I find specimens so labeled and from French Guiana in any of the collections I studied in Europe. The only specimen in Vienna was from Bolivia, and it was smaller than Signoret indicated in the original illustration. I found a male in MHNP, from Peru, agreeing with the original illustration in both size and color, and have used it as the basis for my present identification of *diversa*.

The present interpretation of *Diedrocephala estella* Distant is based on a study of a topotypic male compared with the female lectotype. The female lectotype of *Tettigonia flammea* Signoret has been studied. The paler color, as in the original illustration, separates this species readily from other species in the genus.

My interpretation of *Tettigonia fractilinea* Fowler is based on a study of a topotypic male compared with the female lectotype.

The lectotype of *Tettigonia notanda* Fowler is a female that agrees well with the original description but not well with the original illustration. A specimen from Panama has been found which agrees with the original illustration. It is



FIGURES 325, 326.—325, *Iragua fractilinea* (Fowler) (*p* from specimen from Bogotá, Colombia; remainder from Costa Rica): *p*, Aedeagus from lateral view. 326, *I. notanda* (Fowler) (from specimen from Alhajuelo, Panama).

somewhat teneral and conspecific with darker specimens of which the specimen illustrated here (fig. 326*a*) is an example.

SPECIES OF *IRAGUA*

circulifera (Taschenberg), 1884a:453 (*Tettigonia*). Trinidad Is., Venezuela. New combination.
diversa (Signoret), 1855a:49 (*Tettigonia*) Fr. Guiana, Peru.
estella (Distant), 1908b:59 (*Diedrocephala*). Ecuador. New combination.
flammea (Signoret), 1855a:50 (*Tettigonia*). Fr. Guiana. New combination.
fractilinea (Fowler), 1899e:255 (*Tettigonia*). Costa Rica, Panama, Colombia. New combination.
montana, n. sp. Peru, Bolivia.
notanda (Fowler), 1899e:255 (*Tettigonia*). Panama. New combination.
nubila, n. sp. Colombia, Peru, Brazil.
perplexa, n. sp. Peru.
vallis, n. sp. Brazil.

KEY TO MALES OF *IRAGUA*

1. Pygofer with processes 9
   Pygofer without processes 2

2. Paraphyses with unpaired basal portion short and broad; rami not with one edge erose 3
   Paraphyses with unpaired basal portion relatively long and slender; rami with one edge erose or not 4

3. Aedeagus more slender and elongate, curved gradually dorsad through most of its length ..... *estella* (Distant) (fig. 323)
   Aedeagus shorter, curved gradually ventrad through most of its length *flammea* (Signoret) (fig. 324)

4. Forewings at rest with a narrow black apical border, without apical black spots (occur in Central America) 5
   Forewings with two apical black spots (occur in South America) 6

5. Aedeagal apex regularly rounded, without processes *fractilinea* (Fowler) (fig. 325)
   Aedeagal apex with a slender dorsoapical process *notanda* (Fowler) (fig. 326)

6. Aedeagus slender and biundulate in lateral view *nubila,* n. sp., page 406
   Aedeagus broader, or if slender than not biundulate 7

7. Paraphyses in lateral view with rami arching at least slightly posteroventrad and with their ventral margins erose, at least apically 8
   Paraphyses in lateral view with rami almost straight and with their ventral margins not erose (fig. 328*p*) ..... *montana,* n. sp., page 404

8. Paraphyses very broad anteapically and with an anteapical angular projection on ventral margin of each ramus; aedeagus very short and broad (fig. 329*f*) ..... *vallis,* n. sp., page 408
   Paraphyses longer and more slender (fig. 330 *s-v*); aedeagus longer *diversa* (Signoret) (fig. 330)

9. Aedeagus with dorsal anteapical processes and bifid at apex
perplexa, n. sp., page 410
Aedeagus without processes ..... *circulifera* (Taschenberg) (fig. 332)

Iragua montana, NEW SPECIES

FIGURE 328, PAGE 405

Length of male 10.0-10.9 mm, of female 9.5-11.0 mm. Head with median length of crown varying from three-fourths to eight-tenths interocular width and from slightly more than four-tenths to slightly less than six-tenths transocular width; antennal ledges in lateral view with anterior margins rectilinear. Pronotum without transverse rugae on disk; forewing with texture coriaceous. Male with style extending posteriorly beyond apex of connective; apex convex and with a small acute angularity on mesal margin; aedeagus arched strongly posteroventrally for the genus (fig. 328*f*), with a short dorsoapical and a short ventroapical process; paraphyses with stalk approximately two-thirds length of rami which are straight in lateral view and without emarginations on their ventral margins. Female abdominal sternum VII keeled medially, with posterior margin subangular and without emarginations.

Color of crown, pronotum, and scutellum varying from tan or tan suffused with orange, to orange; forewing orange with veins concolorous or darker, with a small round black spot on vein between bases of second and third apical cells and a similar spot near middle of vein between third and fourth apical cells; membrane whitish translucent and extending along inner margin of inner apical cell and laterally through apical portions of second and third

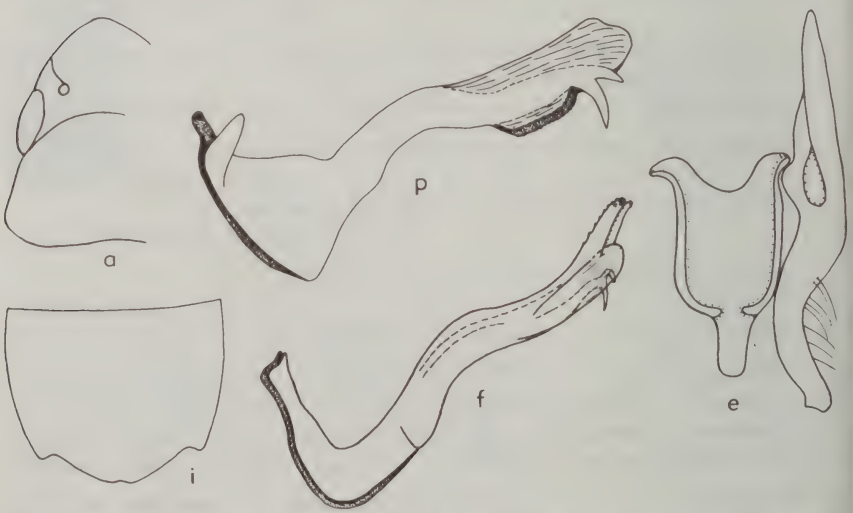


FIGURE 327.—*Iragua nubila,* n. sp. (*p* from holotype; *i* from specimen from Achinamiza, Peru; remainder from Colombia): *p,* Aedeagus from lateral view.

apical cells, a similar whitish angular costal spot opposite base of fourth apical cell, the whitish areas bordered with pink, with two oblique and one transverse narrow black markings in corium approximately opposite apical portion of clavus in typical specimens, but with the middle of the three dark markings greatly enlarged in some other specimens; face, venter, and legs, variously suffused with dull orange in some specimens.

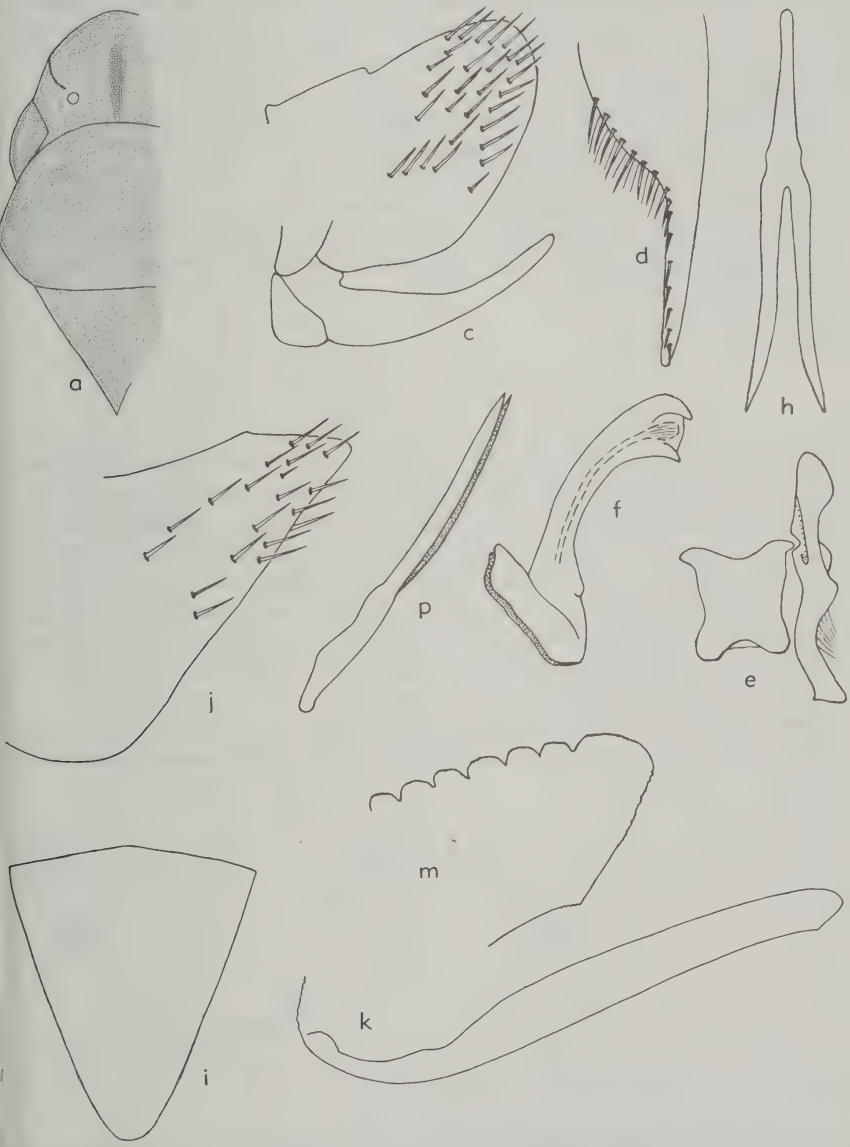


FIGURE 328.—*Iragua montana*, n. sp. (from specimens from Beni Province, Bolivia; *h* from caudoventral view): *p*, Paraphyses from lateral view.

Holotype male and two females, Río Mamore, approximately 10 km. east of San Antonio, Beni Province, Bolivia, August 11 (male) and 13 (females), 1965 (J. K. Bouseman); two females, same data except Río Mamore at mouth of Río Ibare, August 20, and August 15-16 (AMNH). Two males, Las Juntas, Bolivia, December, 1913 (Steinbach) (CM). One male and one female, Huachi, Beni, Bolivia, August (female) and September (male) (W. M. Mann), Mulford Biological Expedition, 1921-22 (USNM). The last two specimens have the enlarged corial dark stripe described above and also an oblique black line in the middle of each clavus, differing in this from all other specimens examined.

In addition to the above, females appearing conspecific, and all with the enlarged corial stripe, are at hand from Satipo, Peru (MCZ); Colonia Perené, Peru (Cornell University); Pachitea, Peru; and Vilcanota, Peru (HNHM).

I. montana, n. sp., is very similar in appearance to *I. diversa* (Signoret) from which it is readily distinguished by the form of the aedeagus and the paraphyses of the male and by the form of female abdominal sternum VII which bears emarginations in *diversa*.

Iragua nubila, NEW SPECIES

FIGURE 327, PAGE 404

Length of male 10.3-10.5 mm, of female 10.6-11.0 mm. Head with median length of crown varying from three-fourths to almost nine-tenths interocular width and from one-half to slightly more than one-half transocular width, ocelli approximately equidistant from median line (holotype) and adjacent anterior eye angle or slightly nearer latter, ocellocular area striate; antennal ledges in lateral view with anterior margin rectilinear. Pronotum obscurely transversely rugulose; forewing with texture coriaceous. Male with style extending posteriorly approximately as far as apex of connective, apex as in *I. montana*, n. sp. Aedeagus with apex of shaft membranous and convex, with or without a pair of dorsal processes arising before and extending beyond apex (fig. 327*f*), apical portion of shaft with a strongly sclerotized rod traversing

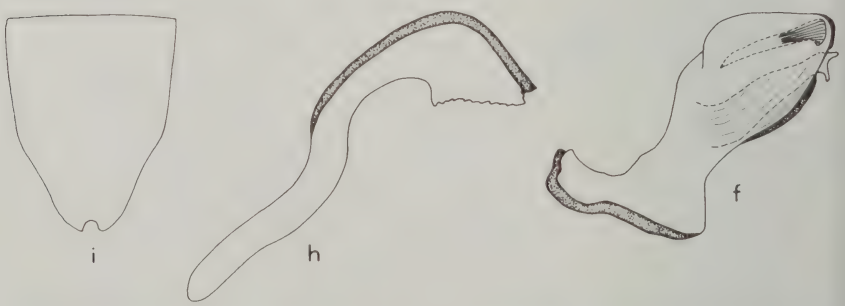


FIGURE 329.—*Iragua vallis*, n. sp. (*f*, *h*, from specimen from Olivença, Amazonas; *i* from topotype; *h* from lateral view).

membranous portion of shaft, decurved and bifid before apex of shaft (both of rami median), shaft biundulate in lateral view but not strongly curved; paraphyses as in *montana,* n. sp. (above). Female abdominal sternum VII not keeled medially, with posterior margin broadly convex (dried specimens appearing more nearly angular than fig. 327*i*).

Crown, pronotum, scutellum, and basal portion of clavus of forewings, black; remainder of forewings orange with veins darker or not, apical black

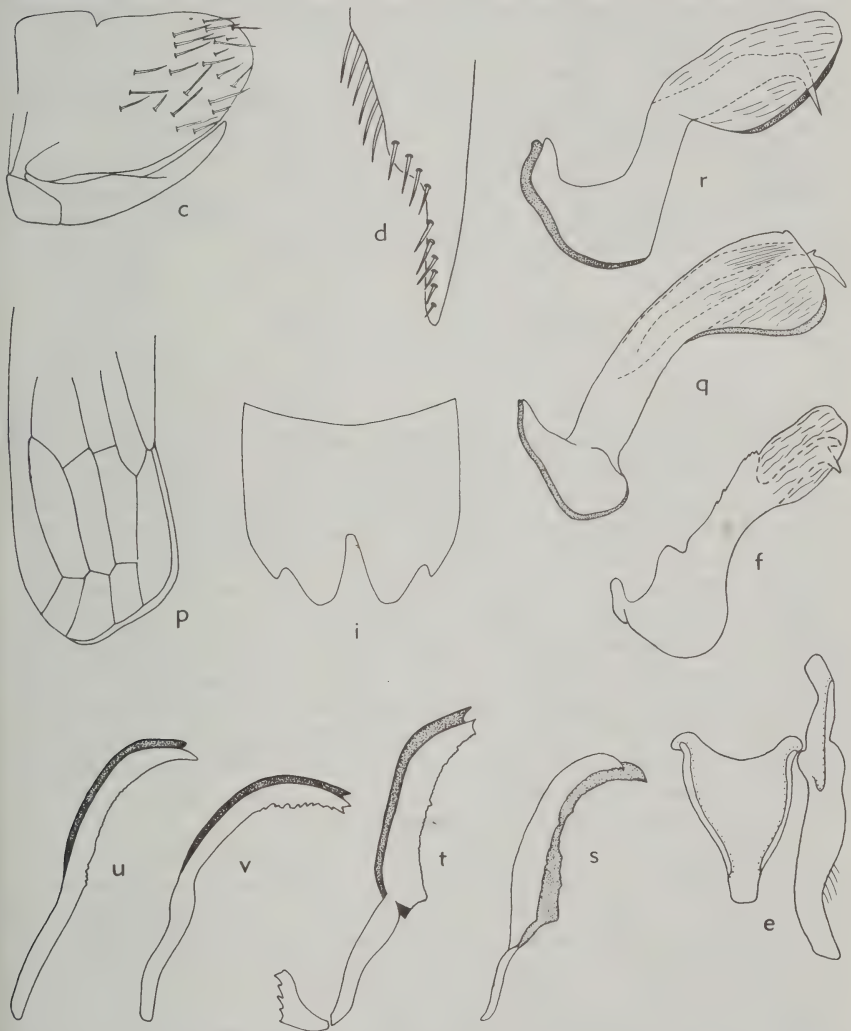


FIGURE 330.—*Iragua diversa* (Signoret) (*c, e, q, s,* from specimen from Ecuador; *p* from Maroni River, French Guiana; *d, f,* from Peru; *i, v,* from Tingo María, Peru, *r, t,* from Río Santiago, Peru; *u* from Río Moroni, Peru): *p,* Forewing apex; *q, r,* aedeagus from lateral view; *s-v,* paraphyses from lateral view.

spots and colors as in *montana,* but with membrane narrower at apex; linear markings of corium as in typical *montana* but with posteriormost two lines reddish-purple in some specimens; face and venter tan to gray.

Holotype male, Peru-Brazil Frontier, February 14, 1928; one female, Río Ucayali, Peru, December 2, 1923; one male, December 24, 1925, two females, January 14, 1926 and December 26, 1925, and one specimen without abdomen, August 28, 1927, all from Achinamiza, Peru [Loreto Province, near Santa Cruz]; one female, Río Santiago, Peru, September 23, 1924 (AMNH). One male, Bogotá, Colombia (L. Richter) (NCS).

The Colombian specimen has a relatively shorter head, compared to the Peruvian specimens, and the apex of the aedeagus varies from the typical condition, but otherwise appears to belong with the other specimens.

I. nubila, n. sp., can be readily separated from other species by the aedeagus of the male which is slender and more elongate than other species except *I. estella* (Distant), which lacks the elongate unpaired basal portion of the paraphyses and the apical spots of the forewings.

Iragua vallis, NEW SPECIES

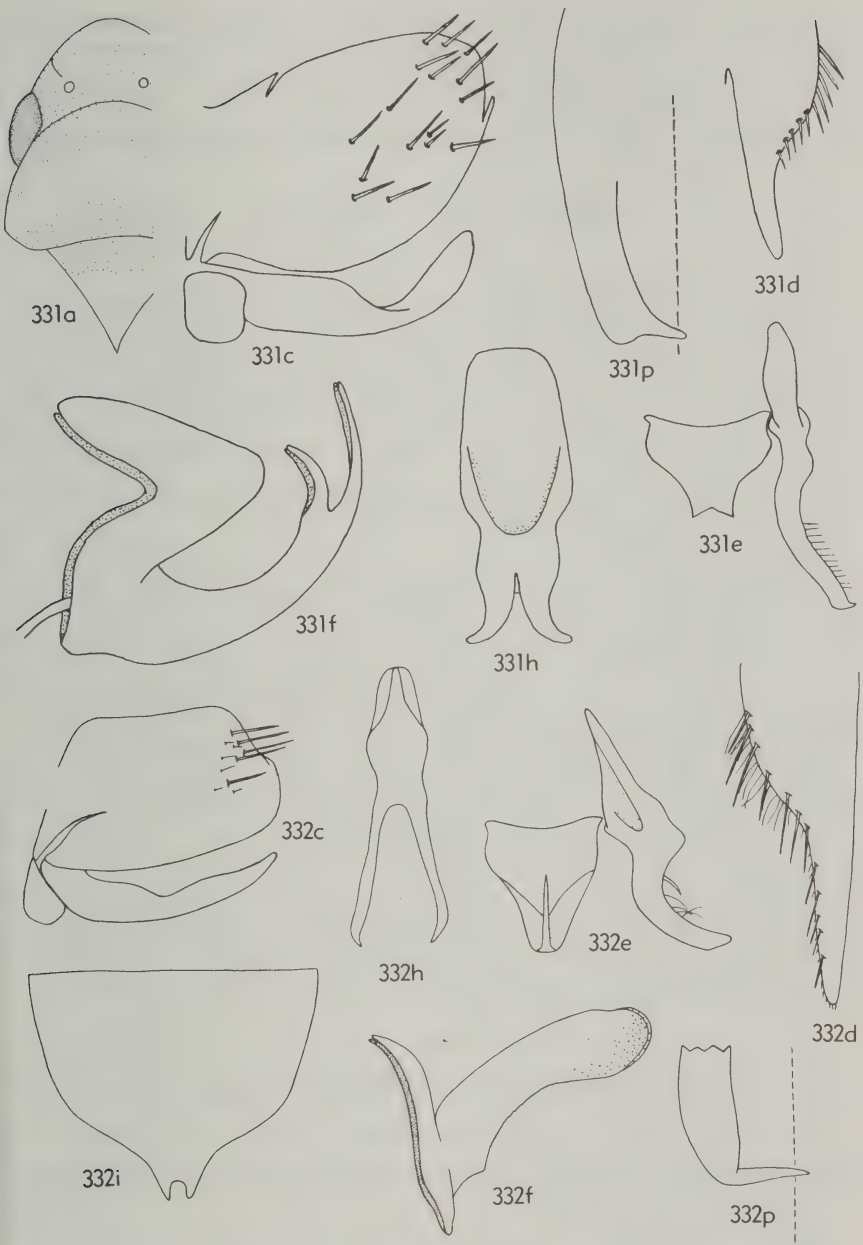
FIGURE 329, PAGE 406

Length of male 9.6 mm, of female 9.4-10.3 mm. Head with median length of crown varying from eight-tenths of to approximately equal to interocular width and from slightly more than one-half to almost six-tenths transocular width, ocelli approximately equidistant from adjacent anterior eye angle and median line of crown, ocellocular area striate; antennal ledges not or weakly carinate dorsally, anterior margin rectilinear. Pronotum transversely rugulose; forewing with texture coriaceous. Male with style extending posteriorly slightly farther than apex of connective, apex as in *I. montana,* n. sp. (above); aedeagus short and very broad for the genus, apical portion of shaft with median sclerotized internal rodlike process as in *I. nubila,* n. sp. (above) (fig. 329*f*); paraphyses with stalk as long as paired rami which are curved posteroventrad in lateral view, obliquely truncate at apex and with oblique margin erose, broader anteapically than in other species of the genus. Female abdominal sternum VII not keeled medially, with posterior margin well produced and rounded or narrowly notched apically.

Crown, pronotum, scutellum, clavus and an adjacent contiguous longitudinal portion of corium extending almost as far towards costal margin as vein M, black, remainder of corium yellow basally, with a broad transverse orange band over apical portion including apical and most of anteapical cells, apical cells suffused with orange, apical black spots as in *montana* but inner spot wider, extending through inner apical cell and onto appendix, membrane narrower at apex than in *montana;* linear black markings of corium as in typical *montana;* face, venter, and legs, pale yellow to gray.

Holotype male and three females, Fontebôa, Upper Amazon; one female and one specimen without abdomen, Tonantins, Amazonas (RMS).

I. vallis, n. sp., differs externally from other species in the genus in the broad median black stripe on its forewings in rest position. The male



FIGURES 331, 332.—331, *Iragua perplexa,* n. sp. holotype (*h* from dorsal view): *p,* Male pygofer apex, right side, from ventral view. 332, *I. circulifera* (Taschenberg) (*i* from specimen from Rancho Grande, Venezuela; remainder from Los Teques, Venezuela; *h* from dorsal view): *p,* Male pygofer apex, right side, from ventral view.

aedeagus and the paraphyses are similar to those of *I. diversa* (Signoret) and might be considered as variants of the several forms of these found in the latter species, but it would be necessary also to assume that the female sternum VII and the color pattern are also variants of the conditions found in *diversa*, assumptions that appear unwarranted for lack of intermediate conditions.

Iragua perplexa, NEW SPECIES

FIGURE 331, PAGE 409

Length of male 8.4 mm. Head with median length of crown varying from seven-tenths to three-fourths interocular width and slightly less than one-half transocular width, antennal ledges in lateral view with anterior margins convex. Pronotum without sculpturing; forewing with texture coriaceous. Male pygofer with a short apical process, style extending well beyond apex of connective, apex subtruncate and acutangular laterally; aedeagus curved gradually dorsally with anteapical dorsal processes and paired apical processes; paraphyses with stalk longer than rami which are tapered and divergent apically. Female unknown.

Crown sordid brown suffused anteriorly with orange; pronotum, scutellum, and forewings yellow, with an anterior pronotal marginal band, an arcuate band across posterior portion of pronotum and anterior portion of scutellum and extending posteriorly a short distance along costal margin of forewings, brown; a pentagonal median marking astride commissural margins and including scutellar apex and subtended by an arcuate transcommissural band that attains costal margin of each wing, dark red; an arcuate dark red transverse band on each wing extending from costal margin across anteapical cells to inner anteapical cell; upper portion of face orange, remainder of face yellow, concolorous with thoracic pleura and legs.

Holotype male, Marcapata, Peru (HNHM), and one additional male, same data (MMB).

I. perplexa is probably more closely related to *circulifera* (Taschenberg) than to other species in the genus, but the larger size and distinctive color pattern of *perplexa* will separate the species readily without dissection, and the differences in the aedeagus are marked.

56. GENUS MICROGONIELLA MELICHAR

FIGURES 333-340

Microgoniella Melichar, 1926a:342. Type-species: *Cicada pudica* Fabricius, by subsequent designation of China, 1938d:183.

Length 4.7-6.7 mm.

Head moderately produced, with median length of crown varying from six-tenths of, to slightly more than interocular width and from slightly more than one-third to six-tenths transocular width, anterior margin usually broadly rounded in dorsal view, without a carina at transition from crown to face,

ocelli located on or before a line between anterior eye angles, variable in relation to comparative distance from median line of crown and anterior eye angle, crown usually with a shallow transverse concavity before ocelli, without sculpturing except granulations near apical margin, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and varying (within species) from rectilinear to slightly convex; clypeus convex, not tumid, muscle impressions usually not distinct, face without pubescence, transclypeal suture not complete, clypellus not produced, its contour almost continuing profile of clypeus.

Thorax with pronotal width equal to or slightly less than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk rarely (variable intraspecifically) with a few weak transverse rugae, not pubescent; scutellum usually without transverse striae on portion behind transverse sulcus. Forewing without a distinct membrane, with apical portion less opaque than remainder but not abruptly delimited, with four apical cells and with base of fourth more proximal than base of third, without an anteapical plexus of veins, anteapical cells with their bases occurring before apex of clavus (exception: middle anteapical cell of *M. illustris* (Signoret)) or obscured (*illustris*, base of outer anteapical cell), texture coriaceous except apically, veins not very distinct, apical margin regularly convex; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere much greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, with apical margin varying interspecifically from broadly convex to acutely subangular, with macrosetae fairly numerous and with arrangement varying interspecifically; dorsal margin usually with an undifferentially sclerotized lobe near its midlength. Plates short, triangular, not extending posteriorly nearly as far as pygofer apex, with few uniseriate macrosetae. Style extending posteriorly beyond apex of connective, narrowly rounded or truncate apically, without a preapical lobe; connective Y- or T-shaped. Aedeagus usually symmetrical, occasionally asymmetrical as result of the processes being not quite similar, or as result of only one process being present and not in median plane. Paraphyses usually absent (exceptions: *M. apicula* (Osborn) and *M. quevedoenis*, n. sp.).

Female abdominal sternum VII with posterior margin produced and angulate. Ovipositor with second valvulae each broadened in apical two-thirds of distance beyond basal curvature and bearing dorsal teeth which are similar throughout, teeth somewhat bilobed and bearing minute secondary denticles, apex bluntly rounded, without anteapical dorsal and ventral denticles (at 120×). Pygofer with a number of irregularly arranged macrosetae on apical two-thirds.

Specimens belonging to *Microgoniella* Melichar have been examined from Costa Rica, Colombia, Venezuela, and the Guianas, and south to Bolivia and Brazil. Specimens of *Microgoniella* are similar in size and appearance to those of *Juliaca* Melichar, but differ in that paraphyses are usually absent or greatly reduced in *Microgoniella* and in that aedeagal processes are usually present. Similarities to *Pachitea* Melichar are discussed in the treatment of that genus.

I have studied the lectotype of *Cicadella apicula* Osborn.

I have seen two specimens of *M. delicatula* Melichar, both females, both from MMB. One has a second specimen consisting only of wings on the same pin. I select the specimen mounted above on its pin as lectotype. It bears labels "S. Antonio" and "♀" and "delicatula M/det. Melichar." and "Typus" and "Microgoniella/delicatula M." and the institutional label. This specimen is not illustrated here. The anterior dorsum is very much like the present illustration of *Subrasaca rhienetta* (Melichar) (fig. 394*a*) except that the posterior transverse band of the pronotum is black, and that there is a median pale spot on the scutellum. The produced seventh sternum does not agree with *Subrasaca*. It seems advisable to retain the species in *Microgoniella* until males are available.

My interpretation of *Cicada pudica* Fabricius is based on drawings of the lectotype and specimens conforming to the drawings. The Guianas are missing from the known distribution of this species, a conspicuous absence in view of the number of Fabrician neotropical species based on specimens from those countries. My interpretation of *Tettigonia dilutipes* Stål is based on a study of the lectotype of that nominal species.

I have interpreted *Tettigonia illustris* Signoret mostly in conformity with the original illustration. This agrees with a specimen from São Paulo, from which I made sketches in Vienna. I have returned specimens to some institutions with the ms. name *Microgoniella chiasta* Young, a *nomen nudum*.

My interpretation of *Tettigonia sociata* Fowler is based on a study of the female lectotype and male specimens agreeing with it and with the original illustration.

I found no specimens of *Erythrogonia tristicula* Melichar during my visit to MMB. My determination of this species is based on a single specimen bearing Melichar's determination label, sent to me subsequently from the Moravian Musuem.

Of a pair of specimens of *Microgoniella vagans* Melichar from the Moravian Museum, the female is presently selected as lectotype and has been so labeled. It bears labels: "Costa Rica" and "vagans M./det. Melichar." and "Typus" and "Microgoniella/vagans M.".

SPECIES OF *MICROGONIELLA*

apicula (Osborn), 1926b:186 (*Cicadella*). Bolivia. New combination.
delicatula Melichar, 1951a:99. Colombia.
gracilis, n. sp. Colombia.
illustris (Signoret), 1854a:11 (*Tettigonia*). Venezuela, Fr. and D. Guiana, N. and S. Brazil.
plutoniella, n. sp. Panama.
pudica (Fabricius), 1803a:65 (*Cicada*). Colombia, Peru, Bolivia, S. Brazil.
  dilutipes (Stål), 1862e:41 (*Tettigonia*).
  comperta Melichar, 1951a:97. New synonymy.
quevedoensis, n. sp. Ecuador.
sociata (Fowler), 1900a:262 (*Tettigonia*). Costa Rica, Panama, Colombia.
  vagans Melichar, 1951a:96. New synonymy.
tristicula (Melichar), 1926a:391 (*Erythrogonia*). Colombia. New combination.

KEY TO MALES OF *MICROGONIELLA*

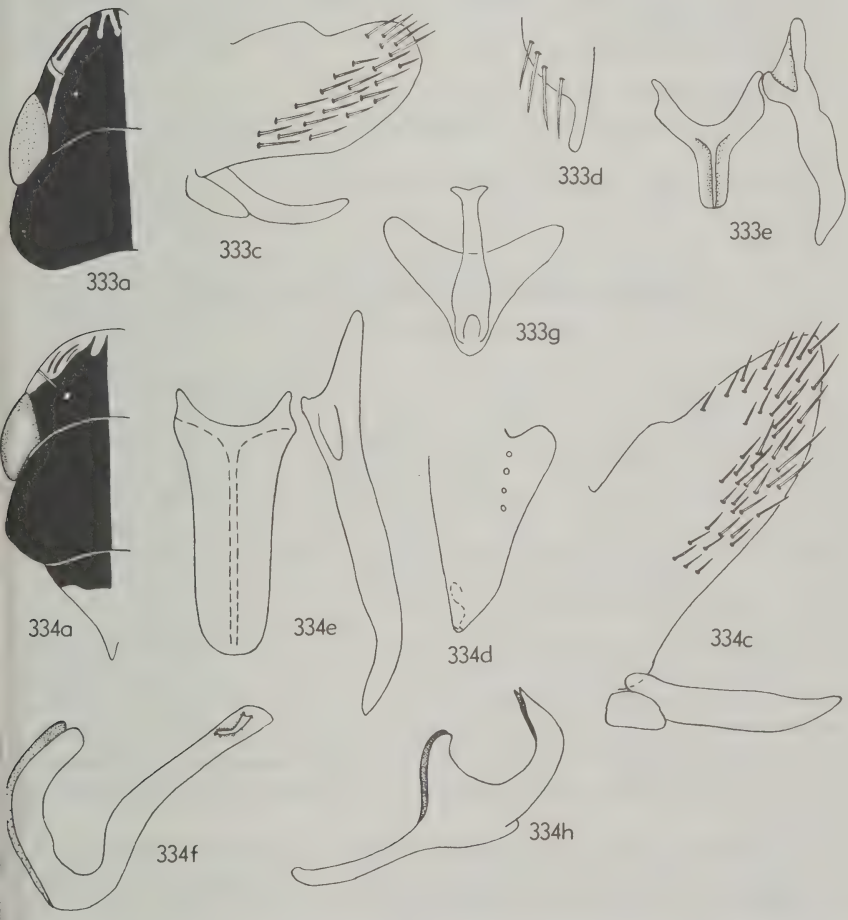
(*M. delicatula* Melichar not included)

1. Forewings at rest each with a large oblique pale vitta in base of clavus; aedeagus short (fig. 333*g*) without processes, expanded at apex *illustris* (Signoret) (fig. 333)

   Forewings at rest without such a diagonal pale marking in base of clavus; aedeagus with processes, or if not, or if indistinct, then shaft definitely longer and more slender (fig. 339*f*) 2

2. Aedeagus with a pair of short acute nearly apical processes directed basally 3

   Aedeagus without apical processes 4



FIGURES 333, 334.—333, *Microgoniella illustris* (Signoret) (from specimen from French Guiana). 334, *M. apicula* (Osborn), lectotype; (*h*, from lateral view).

3. Paraphyses fully developed, consisting of an unpaired basal portion and paired rami ..... *apicula* (Osborn) (fig. 334)
   Paraphyses consisting only of a transverse, broadly V-shaped sclerite *quevedoensis*, n. sp., page 414

4. Pygoger in lateral view with a large convex dorsal lobe 5
   Pygofer in lateral view with dorsal lobe angulate or absent 6

5. Pygofer with posterodorsal lobe digitate, well differentiated from pygofer margin; color black with two transverse white lines *pudica* (Fabricius) (fig. 336)
   Pygofer with posterodorsal lobe more broadly convex, less well differentiated from pygofer margin; color mostly black, without transverse white lines ..... *plutoniella*, n. sp., page 417

6. Scutellum entirely black; aedeagus with ventral processes arising from a common stalk ..... *gracilis*, n. sp., page 415
   Scutellum with at least apex white 7

7. Aedeagal processes long and arising separately at base or reduced to a unilateral vestige; pygofer with angular dorsal lobe visible in lateral view *tristicula* (Melichar) (fig. 339)
   Aedeagal processes shorter; pygofer without a dorsal lobe in lateral view *sociata* (Fowler) (fig. 340)

Microgoniella quevedoensis, NEW SPECIES

FIGURE 335, PAGE 415

Length of male 4.7 mm, of female 5.1-5.7 mm. Head with median length of crown varying from three-fourths of to equal to interocular width and from approximately one-half to six-tenths transocular width, ocelli each almost equidistant from median line of crown and adjacent anterior eye angle, crown with a shallow transverse concavity before ocelli; clypeus with muscle impressions not very distinct except in its upper portion. Forewing with base of middle anteapical cell occurring opposite base of inner anteapical cell and approximately opposite apex of clavus, base of outer anteapical cell obscure. Male pygofer broadly convex at apex, with numerous macrosetae in apical half, dorsal pygofer margin without processes, but with posteroventral margin rolled slightly inward and with a short acute process directed mesad; plates not as abruptly narrowed anteapically as in *M. illustris* (Signoret); aedeagus very slender and elongate, with a pair of anteapical lateral retrorse processes, apex very slightly convex in lateral view; paraphysis consisting of a V-shaped bar. Female abdominal sternum VII without prominent lobes at midlength in lateral view.

Crown and pronotum deep black; scutellum ivory behind transverse sulcus; forewings black basally, becoming gradually translucent apically, with a semi-elliptical ivory spot in base of each clavus and touching claval suture but not extending to commissural margin, and a transcommissural ivory oval spot at claval apex with a short extension into brachial cell of each wing, apical

half of wing with three angular corial markings extending half across wing, and a small triangular spot at midlength of inner apical cell, ivory; face pale except for a few dark arcs in dorsal portion of muscle impressions of clypeus, and for all of antennal ledge except a pale horizontal stripe above base of antenna; proepimeron black except for a narrow ventral pale margin, mesothoracic pleura black except for lower half of mesepimeron, remainder of thoracic pleura pale, legs pale, mesosternum and a spot on each posterior coxa, black.

Holotype male, Quevedo, Ecuador, October 24, 1955, on corn (H. R. Yust); two females, same data except on cotton; one male and one female, Los Ríos, Ecuador, March 2, 1938 (W. C. Macintyre); and one female, Quito, Ecuador, September, 1962 ("J.C.M.C.") (USNM).

M. quevedoensis, n. sp., differs from other species in the genus in its distinct markings and in the aedeagal processes being located almost apically. The female abdominal sternum VII is very similar to the illustration of *M. sociata* (Fowler) (fig. 340*p*).

Microgoniella gracilis, NEW SPECIES

FIGURE 338, PAGE 418

Length of male 5.6-6.0 mm, of female 6.0-6.1 mm. Head with median length of crown varying from slightly less than six-tenths to more than three-fourths interocular width and from slightly more than one-third to one-half transocular width; ocelli on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown or slightly

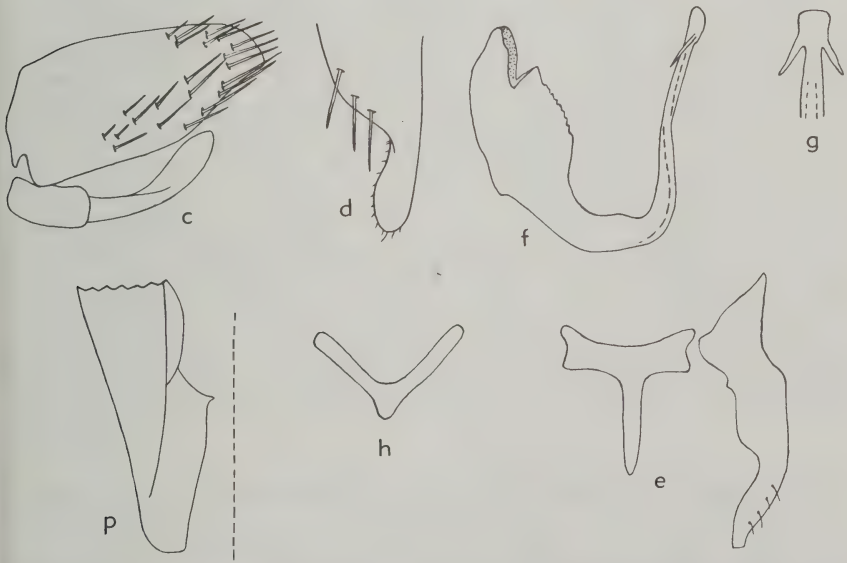


FIGURE 335.—*Microgoniella quevedoensis,* n. sp., holotype; (*g* showing only aedeagal apex): *p,* Male pygofer apex, left side, from dorsal view.

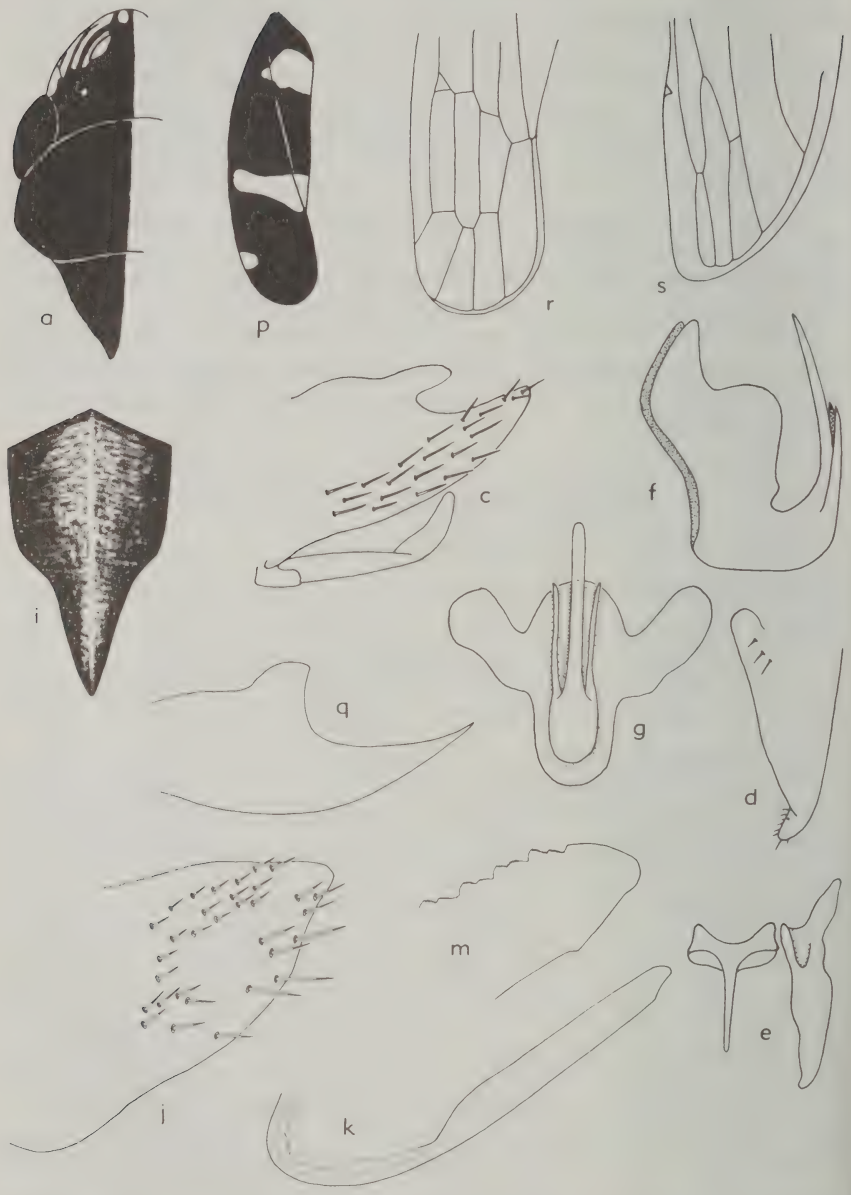


FIGURE 336.—*Microgoniella pudica* (F.) (*a*, *i*, *p*, from lectotype; *j*, *k*, *m*, *q*, from Tingo María, Peru, *r*, *s*, from Chanchamayo, Peru; remainder from Colombia): *p*, Forewing; *q*, female abdominal sternum VII from lateral view, macerated specimen; *r*, forewing, venation at apex; *s*, hindwing, venation at apex.

closer to former, crown without a well defined transverse concavity; clypeus with muscle impressions usually distinct, or distinct on dorsal portion of clypeus only. Forewing with base of middle anteapical cell occurring more basally than base of inner anteapical cell and more basally than apex of clavus, base of outer anteapical cell approximately opposite base of middle anteapical cell. Male pygofer narrowed posteriorly and acute at apex, with numerous large macrosetae on most of surface except basally and basidorsally, dorsal pygofer margin with a short, narrow lobe near its midlength; plates narrow throughout their apical halves; aedeagus with a pair of slender symmetrical ventral processes arising from a common stalk on basal third of shaft, acute at their apices, without additional more apical aedeagal processes, with a slightly asymmetrical median short tapered acute process arising from dorsal portion of atrial rim of aedeagus; paraphyses absent. Female abdominal sternum VII without prominent lobes at midlength in lateral view.

Color of crown, pronotum, and scutellum black; forewing either black with a yellowish costal area opposite outer anteapical cell and a small triangular hyaline spot extending from costal margin to base of outer apical cell (type), or, in addition, with two transverse narrow transcommissural ivory stripes on forewing, one slightly beyond apex of scutellum and tapering on each wing to terminate acutangularly without attaining the costal margin, and the other extending from claval apex anterolaterally to costal margin slightly beyond midlength of latter; face black except narrow marginal areas at apex of clypellus and genae, and in some specimens a few pale arcs near dorsal margin of clypeus; thoracic pleura black; legs and beak pale yellow.

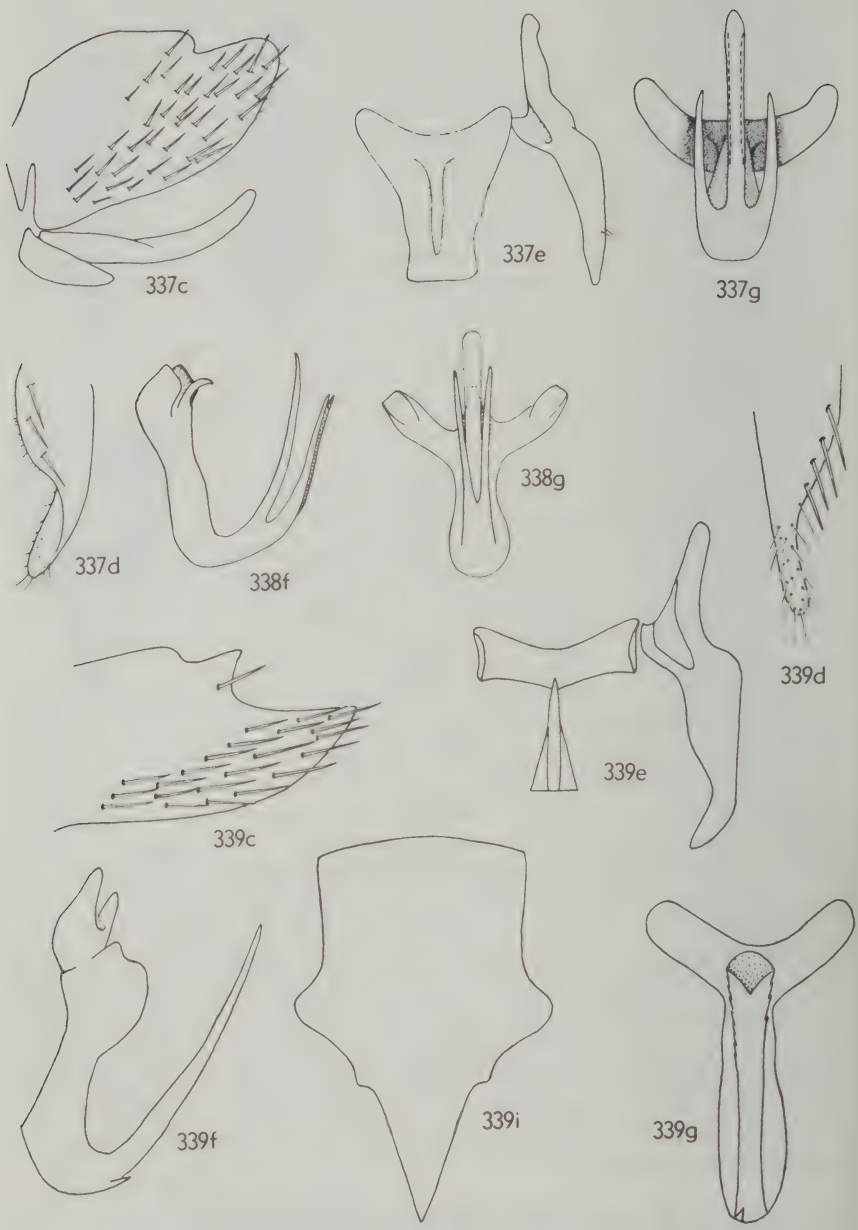
Holotype male, Cundinamarca, Colombia, Río Negro below Pacho, February 26, 1942 (Chapin No. 664) (USNM). Two males and three females, Batatal, Bolivar, Colombia, 1938-1939 (M. Althen-Dahl) (ZIL). Two males, Bogotá, Colombia (Lindig.) (RMS). One male, Puerto Berrio, Colombia, October, 1896 (Prof. O. Bürger) (ZIMH). One male and one female, same locality as preceding, August 5, 1958 (Henry Dybas) (Field Museum). In addition, a male of which only the genitalia and a part of one forewing remain, from Porto Bello, Panama (CAS) appears to belong to this species.

H. gracilis, n. sp., is similar in appearance to *M. pudica* (Fabricius), from which it differs in the smaller lobe on the dorsal pygofer margin, the atrial process and the stalked aedeagal processes in the male, in the lack of a lobe on the abdominal sternum VII of the female, and in the black face in both sexes. It is also similar to *M. plutoniella,* n. sp., in the treatment of which distinguishing characters are discussed. It is also close to *M. sociata* (Fowler) in the angulate dorsal pygofer lobe, and in some specimens of *sociata* an unpaired process of the dorsal apodemes occurs, but it differs from *sociata* in the characters used in the key.

Microgoniella plutoniella, NEW SPECIES

FIGURE 337, PAGE 418

Length of male 5.4 mm. Head with median legnth of crown slightly less than six-tenths interocular width and slightly more than one-third transocular width; ocelli located slightly behind a line between anterior eye angles,



FIGURES 337-339.—337, *Microgoniella plutoniella,* n. sp., holotype. 338, *M. gracilis,* n. sp., holotype. 339, *M. tristicula* (Melichar) (from specimens from Palmira, Valle, Colombia; plate not shown in *c*).

each approximately equidistant from median line of crown and adjacent anterior eye angle, crown with a transverse concavity across ocelli; clypeus with muscle impressions not distinct except in dorsal portion. Forewing with base of middle anteapical cell occurring more proximally than base of inner anteapical cell and more proximal than apex of clavus, base of outer anteapical cell at approximately same level as base of middle anteapical cell. Male pygofer narrowly convex at apex, with a number of elongate macrosetae in a diagonal group parallel to posteroventral pygofer margin, dorsal pygofer margin with a short, very broad convex lobe near midlength; plates somewhat abruptly narrowed at midlength; aedeagus with a pair of short lateral processes arising in basal half, shaft slender, elongate, acute apically, without processes arising more distally than preceding, paraphyses absent. Female unknown.

Color of crown, pronotum, scutellum, and forewings black except a faint translucent costal area opposite outer anteapical cell and a pale rounded spot on clavus and extending to base of outer apical cell; face black with a few pale arcs at base of clypeus, margin of face and color of pleura and venter as in *M. gracilis,* n. sp., above.

Holotype male, Potrerillos, Panama, January 2, 1935 (J. W. MacSwain), on indefinite loan to USNM from NCS.

M. plutoniella, n. sp., is close to *M. gracilis,* n. sp. (above), from which it differs in the lobe of the dorsal male pygofer margin being more convex and less prominent, and in the unstalked condition of the aedeagal processes.

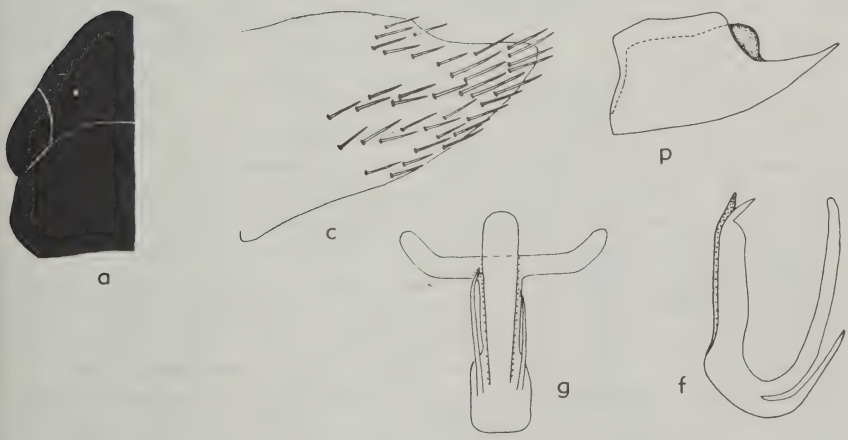


FIGURE 340.—*Microgoniella sociata* (Fowler) (specimens from El Valle, Panama; plate not shown in *c*): *p,* Female abdominal sternum VII from lateral view, macerated specimen.

57. Genus PLATYGONIA Melichar

Figures 341-346

Platygonia Melichar, 1925a:340. Type-species: *Tettigonia praestantior* Fowler, by original designation.

Oxycoryphia Melichar, 1926a:344. Type-species: *Tettigonia spatulata* Signoret, by subsequent designation of China 1938d:184. New synonymy.

Oxygonia Melichar, 1926a:344. Type-species: *Ciccus ignifer* Walker, by subsequent designation of China 1938d:184. Preoccupied.

Oxygonalia Evans, 1947a:163, new name for *Oxygonia* Melichar. New synonymy.

Length 7.8-14.2 mm.

Head very strongly produced, median length of crown varying from nine-tenths of to slightly more than one-fourth greater than interocular width and from slightly more than six-tenths of to equal to transocular width, anterior margin narrowly rounded in dorsal view, usually with a distinct carina at transition from crown to face (exception: *P. angrana,* n. sp.), ocelli located slightly before a line between anterior eye angles, variable with respect to relative distance between anterior eye angle and median length of crown, disk shallowly concave from ocelli to apex (exception: *P. detecta,* n., sp.), with or without a median longitudinal fovea (variable interspecifically), lateral clypeal sutures extending onto crown, attaining ocelli or not; antennal ledges not or very slightly protuberant in dorsal aspect, in lateral view with anterior margins strongly oblique; clypeus flat or slightly concave, muscle impressions distinct or not, face with pubescence usually not distinct except a pair of setae at apex of clypellus, clypellus with profile continuing contour of clypeus.

Thorax with pronotal width equal to or greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk transversly rugose; scutellum striate or not behind transverse sulcus. Forewing without a membrane (exception: *detecta*), veins indistinct, not elevated, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere variable compared with combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin broadly convex, macrosetae from few to many on posterior half, microsetae occasionally present. Plates triangular, not extending posteriorly as far as pygofer apex, narrowed in basal half, with uniseriate macrosetae. Style extending posteriorly almost as far as apex of connective, without preapical lobe, truncate apically. Connective Y-shaped with arms widely divergent and stem longer than arms, keeled. Aedeagus symmetrical with shaft short, simple or with an unpaired ventral process. Paraphyses absent.

Female (unknown in *P. infulata,* n. sp.) abdominal sternum VII produced and with posterior margin convex. Ovipositor with second valvulae each expanded beyond basal curvature, teeth variable, either large and quadrate and bearing secondary teeth but without intercalary secondary teeth, or smaller and not bearing secondary teeth but with conspicuous intercalary teeth,

primaries extending almost to apex which is acute or narrowly rounded, anteapical dorsal and ventral margins with a number of small denticles, anteapical ventral margin rectilinear or slightly concave.

Platygonia occurs in Costa Rica, Panama, New Grenada, Colombia, Ecuador, Peru and southeastern Brazil. The genus is related to *Tipuana* Melichar, from which it differs in having a carina at the transition from crown to face, in having ocelli located before a line between the anterior eye angles, in the flattened or concave clypeus, in having sculpturing on pronotum and scutellum, in the truncate style apex, and in having paraphyses.

The present interpretation of *Tettigonia praestantior* Fowler is based on a male which I compared with the lectotype in the British Museum. The genitalia of this specimen agree with figure 345. The lectotype of *Tettigonia spatulata* Signoret, without an abdomen, agrees externally with specimens I have identified as that species. The genitalia of the male lectotype of *Diedrocephala mitra* Distant agree with the present interpretation of *spatulata*.

Diedrocephala zea Distant is known to me only from the lectotype, a specimen without abdomen, metathorax and hindwings.

SPECIES OF *PLATYGONIA*

angrana, n. sp. SE. Brazil.
detecta, n. sp. Colombia (?).
ignifera (Walker), 1851b:804 *(Ciccus).* Colombia, Peru. New combination.
infulata, n. sp. Ecuador.
praestantior (Fowler), 1899e:254 *(Tettigonia).* Costa Rica, Panama.
spatulata (Signoret), 1854d:722 *(Tettigonia).* Costa Rica, Panama, Colombia, Ecuador. New combination.
mitra (Distant), 1908b:60 *(Diedrocephala).* New synonymy.
zea (Distant), 1908b:60 *(Diedrocephala).* Ecuador.

KEY TO MALES OF *PLATYGONIA*

(*P. zea* (Distant) is not included)

1. Aedeagus in lateral view with a ventral process 3
   Aedeagus in lateral view without a ventral process 2

2. Aedeagus gradually tapered at apex in lateral view
   infulata, n. sp., page 422
   Aedeagus obliquely truncate apically ..... *ignifera* (Walker) (fig. 342)

3. Length less than 7.0 mm (SE. Brazil) ..... *angrana,* n. sp., page 424
   Length more than 9.0 mm (Central America and Colombia) 4

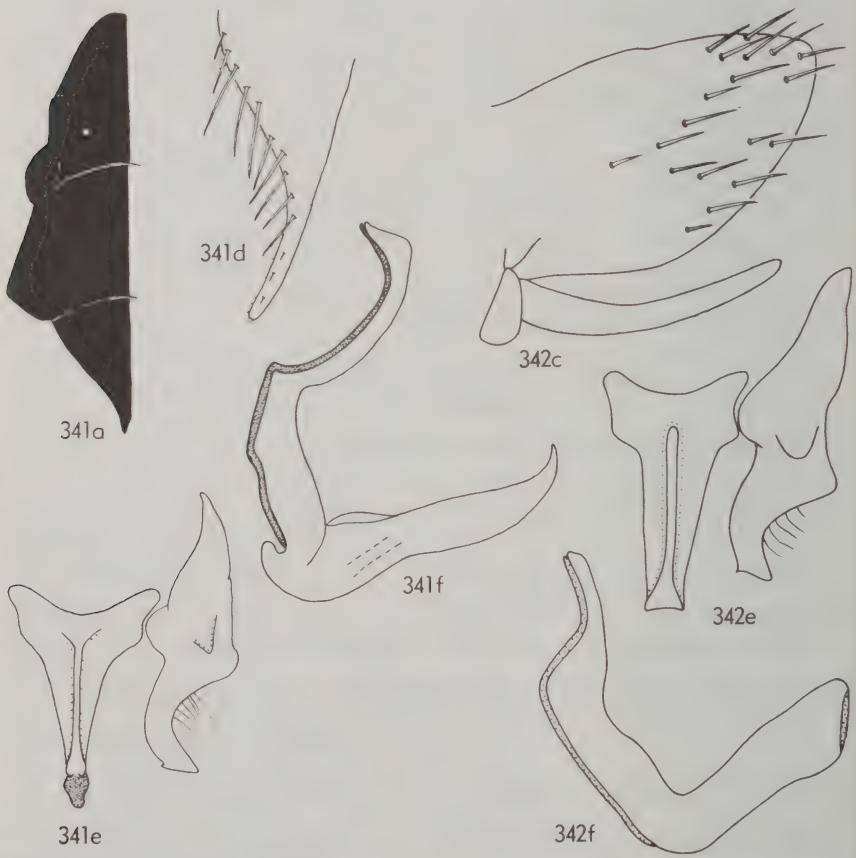
4. Crown with median length greater than interocular width 5
   Crown with median length less than interocular width
   praestantior (Fowler) (fig. 345)

5. Disk of crown convex before ocelli; crown almost entirely black
   detecta, n. sp., page 425
   Disk of crown concave before ocelli; crown black only at lateral margins
   spatulata (Signoret) (fig. 344)

Platygonia infulata, NEW SPECIES

FIGURE 341

Length of male 10.0 mm. Head with median length of crown one-tenth greater than interocular width and nine-tenths transocular width, ocelli each closer to adjacent anterior eye angle than to median line of crown, disk of crown with a narrow median fovea extending from near base to apical third, lateral clypeal sutures not attaining ocelli, antennal ledges each with a narrow longitudinal fovea in dorsal view; clypeus concave in lateral view, with a slight median convex protuberance beneath apex of head, muscle impressions distinct. Thorax with pronotal width greater than transocular width of head; scutellum striate behind transverse sulcus; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Other external characters as in generic description. Male with aedeagal shaft gradually



FIGURES 341, 342.—341, *Platygonia infulata*, n. sp., holotype. 342, *P. ignifera* (Walker) (from specimen from Rioja, Peru).

tapered in apical half to acute apex which is curved slightly dorsally, without processes; other male genital characters as in generic description. Female unknown.

Color of crown, pronotum, scutellum, and forewing apices beyond apex of clavi, black; face except paler area on each side of clypeus near antennal base, venter, thoracic pleura, and legs, black.

Holotype male, "Tuyo-c", Ecuador (USNM).

P. infulata, n. sp., in known only from the holotype. This species may be distinguished from other species in the genus by the tapered aedeagal shaft which lacks processes.

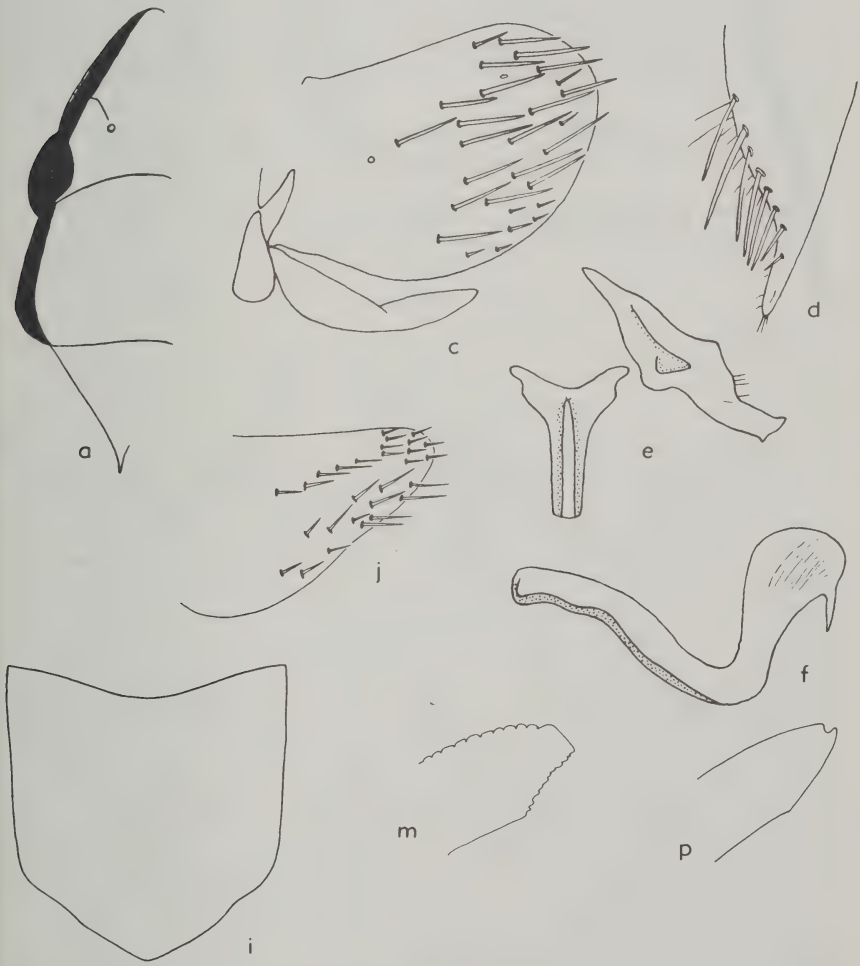


FIGURE 343.—*Platygonia angrana,* n. sp. (*i, j, m, p,* from topotype; remainder from holotype): *p,* Apex of first valvula of ovipositor.

Platygonia angrana, NEW SPECIES

FIGURE 343, PAGE 423

Length of male 7.8 mm, of female 8.7 mm. Head with median length of crown more than nine-tenths interocular width and approximately two-thirds transocular width, ocelli each closer to adjacent anterior eye angle than to median line of crown, disk of crown without a median fovea, lateral clypeal sutures extending onto crown and attaining ocelli (holotype) or not, antennal ledges without a narrow longitudinal fovea in dorsal view; clypeus flat in lateral view, with a median convex protuberance slightly below midlength,

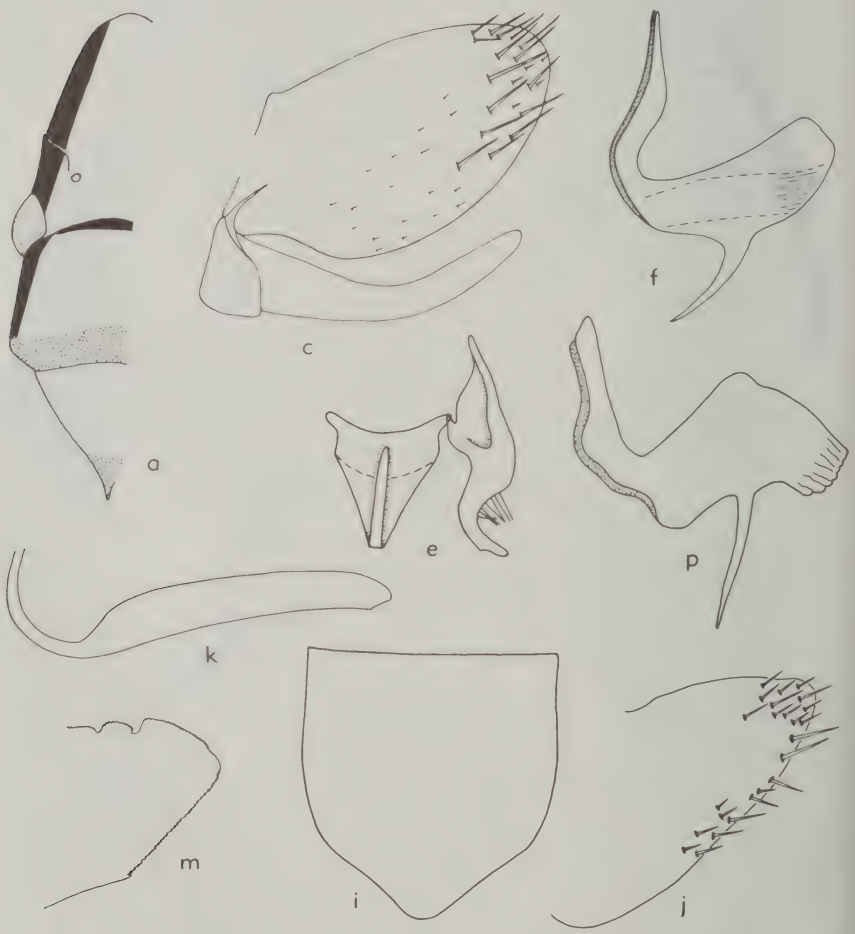


FIGURE 344.—*Platygonia spatulata* (Signoret) (*a, c, f,* from specimen from Ecuador; *e, p,* from Costa Rica; remainder from Colombia): *p,* Aedeagus from lateral view.

muscle impressions not very distinct. Thorax with pronotal width greater than transocular width of head; scutellum not striate behind transverse sulcus; hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Other external characters as in generic description. Male with plates not extending nearly as far posteriorly as pygofer apex, aedeagal shaft broadened in apical half in lateral view and with an apical ventral unpaired retrorse acute process; other male genital characters an in generic description. Female with second valvula of ovipositor with quadrate primary teeth extending almost to apex, apicoventral margin concave.

Color amber, lateral margins of crown except at apex, lateral margins of pronotum, a longitudinal irregular vitta on forewing bordering basal half of claval suture, crossing claval suture at midlength of latter, extending posteriorly to basal portion of inner apical cell, a lateral branch to costal margin, and wing apices narrowly, black. Type with apical half of clavus and a poorly delimited spot in anteapical cells, pink. Face, thoracic pleura, and legs, yellow.

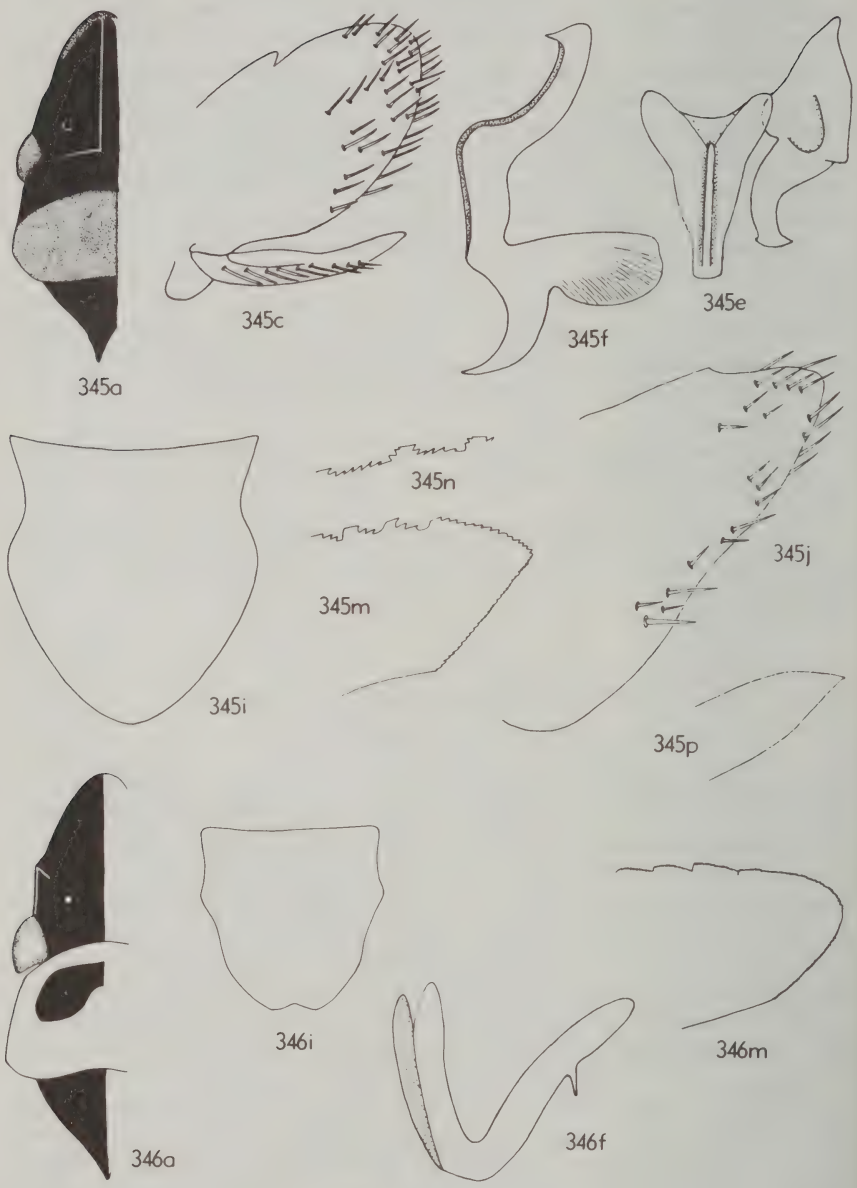
Holotype male, Jurassal, Angra, Estado de Rio (Travassos and Lopes), October, 1934 and one topotypic female, November, 1934 (L. Travassos) (USNM).

P. angrana, n. sp., can be distinguished from all other species in the genus by its much smaller size, by its color pattern, and by the shape of the aedeagus in lateral view.

Platygonia detecta, NEW SPECIES

FIGURE 346, PAGE 426

Length of male 12.0 mm, of female 12.0-12.4 mm. Head of male with median length of crown almost one-half greater than interocular width and almost nine-tenths transocular width; of female with median length of crown from very slightly greater to one-fifth greater than interocular width and from seven-tenths to almost nine-tenths transocular width, ocelli each closer to median line of crown than to adjacent anterior eye angle, disk of crown convex medially before ocelli, lateral clypeal sutures not attaining ocelli, antennal ledges not foveate; clypeus concave in lateral view, without a protuberance beneath apex of head, muscle impressions obscure in male, distinct in female. Thorax with pronotal width greater than transocular width of head; scutellum not (type) or only obscurely striate behind transverse sulcus; forewing with inner apical cell membranous; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Other external characters as in generic description. Male with aedeagal shaft slender and of almost uniform width throughout length, with a short, straight, thornlike ventral process near midlength (of genital structures not illustrated, the plates, styles, and connective are most like *P. infulata,* n. sp.). Female with second valvulae of ovipositor with quadrate teeth extending almost to apex, apicoventral margin convex.



FIGURES 345, 346.—345, *Platygonia praestantior* (Fowler) (*a, c-f,* from specimen from Costa Rica; remainder from Chiriquí, Panama): *p,* Apex of first valvula of ovipositor. 346, *P. detecta,* n. sp. (*a, f,* from holotype; *i, m,* from topotype).

Male with crown black except lateral margins of antennal ledges, pronotum amber with a transverse bilobed black spot in basal half, scutellum black except apex which is narrowly amber, forewings each dull red to claval apex, remainder fumose and enclosing a dull red spot before apical cells, face black except narrow pale margin at transition to crown, that broadens and extends below antennal ledge on each side onto genae; proepisternum and a small adjoining spot on tan proepimeron, black, mesepisternum pale dorsally, remainder of pleura, and venter, black, prothoracic legs stramineous, remaining legs mostly black. Female entirely tan dorsally except faint tinge of red on forewings, varying in extent, face as in male except that antennal ledges are pale and pale marginal area is broader, thoracic pleura and venter as in male, legs pale, with posterior femora and tibiae (except the knees) dark in two of the three specimens at hand.

Holotype male and one female, taken *in copula*, Alto de las Cruces, W. Cordillera [Colombia?], and two additional females, same locality (MMB).

P. detecta, n. sp., is closely related to *P. angrana,* n. sp., but the convex crown, before the ocelli, differs from all other species of *Platygonia.*

58. PALINGONALIA, NEW GENUS

FIGURE 347

Type-species: *Tettigonia bigutta* Signoret (1854a:6).

Length 7.2-7.6 mm.

Head slightly produced, median length of crown from slightly less than one-half to almost six-tenths interocular width and from one-third to four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located slightly before a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, crown without a concavity between or before ocelli, surface finely granulate, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and rectilinear; clypeus convex, muscle impressions distinct.

Thorax with pronotal width equal to transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk not or only obscurely transversely rugulose; scutellum not or only obscurely transversely rugulose behind transverse sulcus. Forewing with membrane including all apical cells (venation obscure in specimens at hand). Hindleg with femoral setal formula 2:1:1, length of first tarsomere slightly greater than combined length of more distal tarsomeres (plantar setae not observed).

Male genitalia: Sternum VIII deeply emarginate medially, with a convex lobe on each side of the concavity. Pygofer very short, convex apically, with a group of macrosetae before posterior margin, without processes. Plates very short and broad, partly concealed by lobes of sternum VIII in ventral view, each with uniseriate macrosetae. Style very short, truncate apically, with a

lateral lobe near middle of shank. Connective elongate T-shaped, the stalk extending posteriorly much beyond the style apices and articulating with a slender median sclerotized structure that extends dorsally and articulates with the aedeagus. Aedeagus falciform, its apex directed ventrad, gonopore on posterior margin near midlength of shaft. Paraphyses absent (perhaps represented by extra segment of aedeagus described above).

Female abdominal sternum VII with posterior margin produced and gradually tapered to subtruncate apex. Ovipositor with second valvulae broad beyond basal curvature and bearing primary teeth that are small near base, but broad through most of dorsal margin, apices acute, ventral margins rectilinear. Pygofer moderately produced with posterodorsal margin narrowly rounded. The second valvulae are much like the illustration of *Balacha melanocephala* (Signoret) (fig. 593); the pygofer like *Cyclogonia serenula* (Breddin).

Palingonalia, new genus, is known only from the type-species, which occurs in French Guiana and eastern Brazil. I have seen the lectotype and three additional specimens. The species is marked like several species of *Soosiulus*, new genus, black and orange.

I have placed *Palingonalia* near *Soosiulus* because of its similarity in appearance, because species with a similar aedeagus occur in *Soosiulus*, and because the latter includes species with an elongate connective. The long median sclerite beyond the connective and the peculiar form of the eighth sternum of the male; and the acute second valvulae of the female differ from *Soosiulus*.

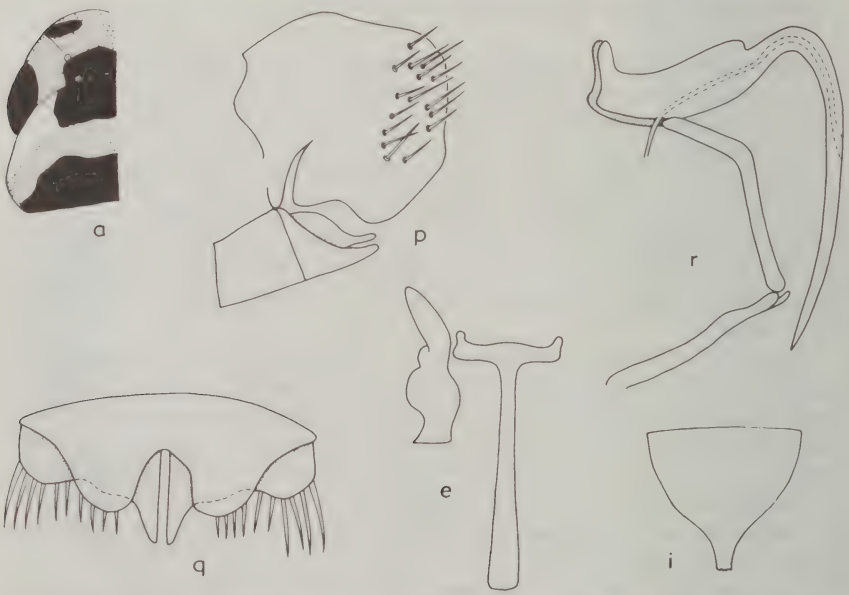


FIGURE 347.—*Palingonalia bigutta* (Signoret) (*a*, *i*, from specimen from Bahia, Brazil; remainder from French Guiana): *p*, Male pygofer, plates (without setae) and sternum VIII, from lateral view; *q*, male sternum VIII and plates, from ventral view; *r*, apex of connective,"paraphysis", and aedeagus, from lateral view.

59. PAMPLONOIDEA, NEW GENUS

FIGURE 348

Type-species: *Pamplonoidea yalea,* new species.

Length of male 9.1-9.4 mm.

Head deltoid, median length approximately equal to interocular width and almost six-tenths transocular width, ocelli located behind a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, median line impressed, ocellocular area not more depressed than remainder of crown, surface of crown without pubescence; antennal ledges scarcely protuberant in dorsal view, in lateral view with anterior margins strongly convex, with a dorsal fovea and a dorsal carina; face slightly convex in lateral view. Other head characters as in *Pamplona* Melichar (below).

Thorax with pronotal width less than transocular width of head, lateral margins subparallel, surface without sculpturing, very weakly and very finely pubescent. Forewing hyaline with a coriaceous area adjacent to scutellum and another before anteapical cells, veins distinct. Hindleg with femoral setal formula 2:1:1, first tarsomere with length very much greater than combined length of second and third tarsomeres. Other thoracic characters as in *Pamplona.*

Male genitalia: Pygofer moderately produced, posterior margin weakly convex, with numerous submarginal microsetae parallel to posterior and posteroventral margin, with a few interspersed macrosetae near posterodorsal margin, with a posteroventral apical process extending mesad and crossing its complement. Male plates extending farther posteriorly than pygofer apex, each with

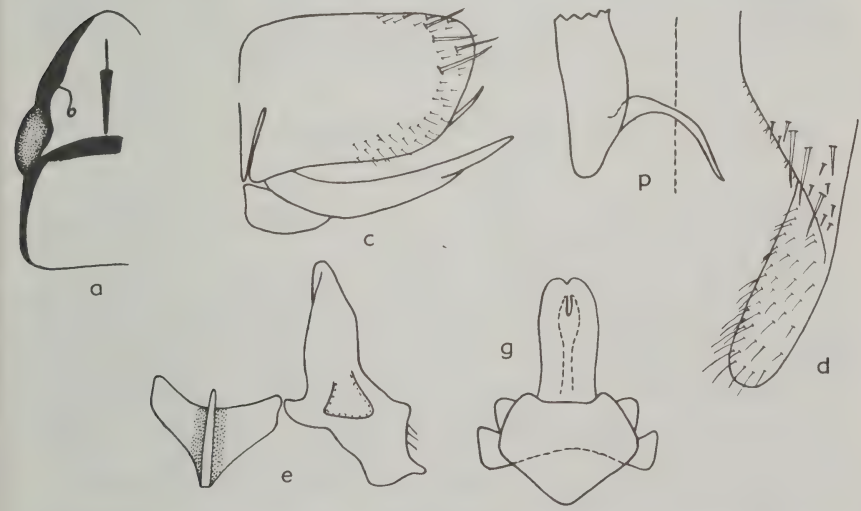


FIGURE 348.—*Pamplonoidea yalea,* n. sp. (from specimen from Santa Catharina, Brazil): *p,* Male pygofer apex, right side, ventral view.

a number of microsetae, and a few macrosetae on basal half. Style extending approximately as far posteriorly as apex of connective, with a distinct preapical lobe, apex truncate with a narrow lateral lobe. Connective V-shaped with a strong median carina. Aedeagus symmetrical, short, closely associated with anal tube, not articulated with apex of connective, without processes but with basal lobes. Paraphyses absent.

Female unknown.

Pamplonoidea, new genus, is known only from type-species which occurs in southeastern Brazil. The genus is very similar to *Pamplona* in the treatment of which differentiating characters are discussed.

Pamplonoidea yalea, NEW SPECIES

FIGURE 348

Structural characters as in generic description. Ground color or crown, pronotum and scutellum, yellow to yellowish-green, anterolateral margins and median line of crown, anterior and lateral margins of pronotum and basal margin of scutellum, black; forewings hyaline with black veins except greenish coriaceous basal third of clavus, and an oval yellow corial coriaceous area before anteapical cells which is traversed by black longitudinal veins, with or without an additional much smaller round yellow coriaceous spot in base of outer anteapical cell, claval coriaceous area bordered anteriorly and posteriorly, and corial area or areas completely surrounded by translucent smoky black areas; face, thoracic pleura, and venter black, with a spot on each side of clypeus extending onto gena, proepisternum, lower portion of proepimeron, a spot on mesepisternum and most of mesepimeron, bright yellow; legs tan.

Holotype male, Rio de Janeiro, Brazil, November, 1957 (Seabra and Alvarenga) (USNM). One male, Espírito Santo, Brazil (RMS). One male, "Corupa", Santa Catharina, Brazil, January 1930 (AMNH).

60. GENUS PAMPLONA MELICHAR

FIGURES 349-352

Pamplona Melichar, 1926a:343. Type-species: *Tettigonia feralis* Fowler, by subsequent designation of China, 1938d:184.

Length of male 11.3-13.3 mm, of female 11.3-13.9 mm.

Head deltoid, median length slightly less than interocular width and from slightly more than one-half to six-tenths transocular width, anterior margin narrowly rounded in dorsal view, with only a narrow carina at median portion of transition from crown to face, ocelli located slightly behind a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line, disk of crown curved slightly upward in apical half, median portion concave, the concavity delimited anteriorly and anterolaterally by the elevated muscle impressions, usually with ocellocular area slightly depressed, without sculpturing, with sparse fine pubescence (often rubbed

off), lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges slightly protuberant, with anterior margins oblique in dorsal view, and bearing a concavity in lateral view, ledges foveate dorsally; face convex, finely pubescent, muscle impressions distinct; transclypeal suture obscure.

Thorax with pronotal width slightly less than, equal to, or greater than transocular width of head, lateral margins usually slightly convergent anteriorly, dorsopleural carina complete, rectilinear, and slightly oblique, posterior margin concave, posterior two-thirds of surface transversely rugose and pubescent, occasionally punctate also; scutellum not or only weakly striate behind transverse sulcus. Forewing with membrane including all of apical cells and part of margin before outer apical cell, and occasionally apical portions of anteapical cells, veins elevated and distinct, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous; forewings of female in rest position exceeding ovipositor. Hindleg in rest position with knee not attaining posterior proepimeral margin; femoral setal formula 2:0:0; first tarsomere with length greater than combined length of second and third tarsomeres, with two longitudinal rows of plantar setae.

Male genitalia: Pygofer not strongy produced, posterior margin regularly convex to very irregular, with a number of regularly spaced microsetae covering most of surface or only posterior half of surface, with few to many interspersed macrosetae, without processes. Plates triangular, abruptly narrowed in basal half, separate throughout their length, extending posteriorly almost as far as apex of pygofer, with numerous microsetae and occasionally with interspersed macrosetae. Style extending farther posteriorly than apex of connective, with a distinct preapical lobe, apex broadly rounded or truncate apically. Connective transverse and somewhat crescentiform, widely separating the styles, with a strong median keel. Aedeagus symmetrical, with one pair of processes arising on or near atrium, and usually with a pair of more distal processes arising at sides of shaft near midlength. Paraphyses absent.

Female abdominal sternum VII either lobate or emarginate medially, shape variable interspecifically. Second valvula with dorsal margin broadly expanded beyond basal curvature and with primary teeth extending completely to apex, each bearing smaller secondary teeth, apex broadly rounded, with minute denticles on caudoventral margin. Pygofer with numerous microsetae on dorsal portion and a few macrosetae anteapically and on apical margin.

The genus *Pamplona* occurs in Panama, Colombia, Ecuador, Peru, Bolivia, and Brazil. It is closely related to *Pamplonoidea,* new genus (above), but differs conspicuously in the texture of the disk of the forewings which is hyaline in the middle third in *Pamplonoidea,* in its larger size, in its less flattened posterior tibiae, the carinate lower margin of its proepisternum, and in the absence of elongate setae in row 1 of the posterior tibiae.

Pamplona is somewhat similar to the Proconiini. The posterior tibiae which are quadrate in section, the failure of the posterior femoro-tibial joints to attain the posterior proepimeral margins when at rest, and the pubescent face are characters common in Proconiini.

The present identification of the male of *Tettigonia feralis* Fowler is based on a topotypic specimen compared with the female lectotype. The present determination of the male of *T. ulcerata* Signoret is based on specimens of both sexes from Colombia and Bolivia of which the females agree with the accompanying illustrations of the lectotype. It was noted in the designation of the lectotype that the specimen had abnormal legs. The additional specimens of *ulcerata* examined have normal legs.

Species of *Pamplona* are very similar in appearance, externally, with the result that correct association of the sexes is a problem. For this reason,

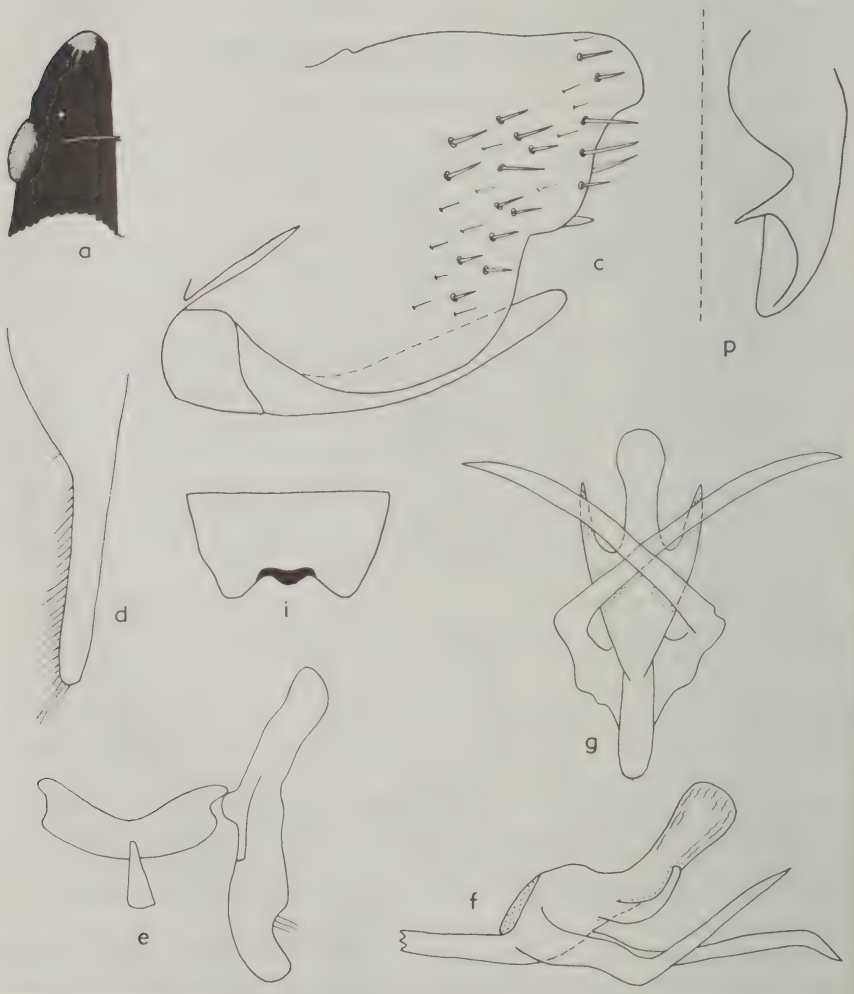


FIGURE 349.—*Pamplona feralis* (Fowler) (*i* from specimen from Chiriquí, Panama; remainder from Panama): *p*, Male pygofer apex, left side, from caudoventral view.

because both of the lectotypes of the previously described species are females, and because both of the two new species described below are known only from females, the following key is based on females. A damaged male of an apparently undescribed species (not described below) has styles and connective like those of the type-species of *Pamplonoidea*. This specimen has only a single pair of aedeagal processes.

SPECIES OF *PAMPLONA*

emarginata, n. sp., Colombia, Ecuador.
feralis (Fowler), 1899e:254 *(Tettigonia).* Panama.
spatulata, n. sp., Peru, Bolivia.
ulcerata (Signoret), 1854d:722 *(Tettigonia).* Brazil, Colombia, Bolivia. New combination.

KEY TO FEMALES OF *PAMPLONA*

1. Abdominal sternum VII deeply emarginate medially, strongly produced laterally ..... *emarginata,* n. sp.
   Abdominal sternum VII trilobate, not as above 2
2. Abdominal sternum VII with depth of median lobe greater than width (fig. 352*i*) ..... *spatulata,* n. sp.
   Abdominal sternum VII with depth of median lobe much less 3
3. Abdominal sternum VII with median lobe convex
   feralis (Fowler) (fig. 349)
   Abdominal sternum VII with median lobe concave
   ulcerata (Signoret) (fig. 350)

Pamplona emarginata, NEW SPECIES

FIGURE 351, PAGE 434

Length of female 12.2 mm.

Head with median length slightly less than six-tenths transocular width, ocellocular area slightly concave laterad of each ocellus. Thorax with pronotal width slightly less than transocular width of head, pronotal and scutellar sculpturing obscured. Forewing with membrane not including apical portions of anteapical cells. Female abdominal sternum VII deeply concavely emarginate medially. Other structural characters as in generic description. Color of dorsum sordid dark gray, face and thoracic venter tan, legs black except tan hind femora.

Holotype female, Bogotá, Colombia (Lindig) (RMS).

P. emarginata, n. sp., differs from all other known species of *Pamplona* in the deep emargination of the female abdominal sternum VII.

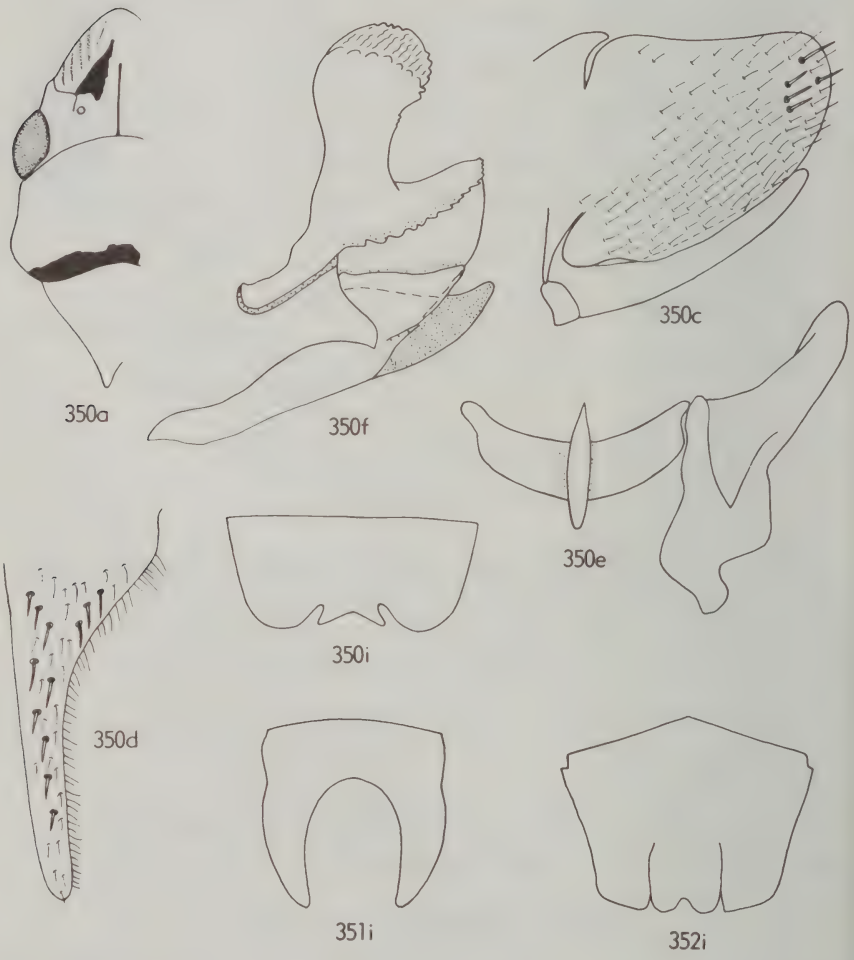
Pamplona spatulata, NEW SPECIES

FIGURE 352, PAGE 434

Length of female 11.4-12.1 mm.

Head with median length from slightly less than to slightly more than transocular width, ocellocular area slighty concave laterad of each ocellus.

Thorax with pronotal width slightly less than transocular width of head, posterior two-thirds of pronotum and apical half of scutellum transversely rugose. Forewing with membrane including apical portions of anteapical cells. Female abdominal sternum VII deeply trilobate, the lobes subequal in width, median lobe with apical margin concave medially. Other structural characters as in generic description. Color of dorsum tan to dark gray, face concolorous with dorsum (type with median area brown between muscle impressions), thoracic pleura ivory except pro- and mesepisternum which are pink, legs tan.



FIGURES 350-352.—350, *Pamplona ulcerata* (Signoret) (*a, i,* from lectotype; remainder from specimen from Bogotá, Colombia). 351, *P. emarginata,* n. sp., holotype. 352, *P. spatulata,* n. sp., holotype.

Holotype female, Chanchamayo, Peru, July 25, 1960, (Ramirez, Salazar and Young) on indefinite loan to USNM from NCS. Three additional specimens, Callanga, Peru; specimens from Chaco, Bolivia and Coroico, Bolivia (RMS). One specimen Coroico, Bolivia (OSU). One female "Toungas de la Paz", Bolivia (BM).

The form of the female abdominal sternum VII will differentiate *Pamplona spatulata,* n. sp., from other species of the genus.

61. AUROGONALIA, NEW GENUS

FIGURE 353

Type-species: *Aurogonalia dorada,* new species.

Length of male 11.3 mm.

Head very strongly produced, median length of crown equal to interocular width and slightly more than six-tenths transocular width, anterior margin narrowly rounded in dorsal view, with a carina at median portion of transition from crown to face, ocelli located on a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, with a shallow median fovea extending from near posterior margin of crown almost to apex, lateral clypeal sutures extending onto crown but not attaining ocelli; antennal ledges protuberant in dorsal view, in lateral view with anterior margins oblique and slightly concave; clypeus convex, muscle impressions distinct, clypellus with profile continuing contour of clypeus.

Thorax with pronotal width approximately equal to transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk without sculpturing; scutellum not striate

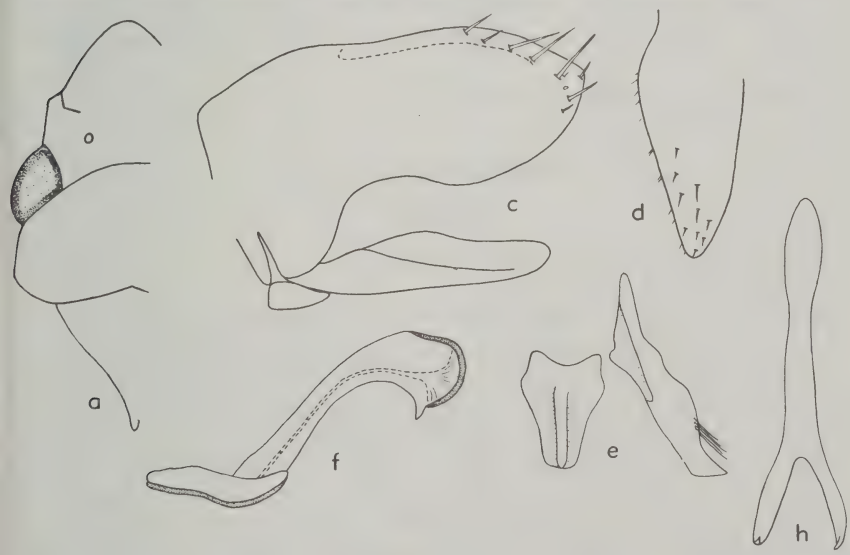


FIGURE 353.—*Aurogonalia dorada,* n. sp., holotype (*h* from dorsal view).

behind transverse sulcus. Forewing with membrane including inner portion of inner apical cell and apical portions of remaining apical cells, veins not elevated, not very distinct, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture subhyaline, without sculpturing. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, posterior margin narrowly rounded, ventral margin with a broad concavity, dorsal margin thickened and processlike, macrosetae few and located parallel to posterodorsal and posterior margin. Plates subtriangular but rounded at apices, not extending posteriorly as far as pygofer apex, with multiseriate small setae. Style extending posteriorly slightly farther than apex of connective, without preapical lobe, truncate apically. Connective somewhat Y-shaped with stem broad. Aedeagus with shaft slender, broadened and decurved at apex, with a short anteapical median ventral process. Paraphyses very long-stalked, rami curved dorsally at their apices.

Female unknown.

Aurogonalia, new genus, is known only from the type-species from Ecuador, described below. The genus is close to *Platygonia* Melichar, but differs in having paraphyses, and male plates that are rounded apically. It is also similar in form to *Pamplonoidea*, new genus, which also lacks paraphyses.

Aurogonalia dorada, NEW SPECIES

FIGURE 353

Structural characters as in generic description. Crown, pronotum, bases of forewings, face, propleura, and legs, orange; scutellum and thoracic venter yellow.

Holotype male, Ecuador (USNM).

62. MEDLEROLA, NEW GENUS

FIGURE 354

Type-species: *Medlerola motiva*, new species.

Length of male 6.5-6.6 mm.

Head well produced, median length of crown approximately equal to interocular width and approximately six-tenths transocular width, anterior margin narrowly rounded in dorsal view, ocelli located before a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle; crown with a transverse concavity across ocelli, without a median longitudinal fovea, without sculpturing, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins convex and oblique; clypeus flattened medially, muscle impressions not distinct, face without

pubescence, transclypeal suture obsolete medially, clypellus with contour of its lower portion slightly more nearly horizontal than profile of remainder of face.

Thorax with pronotal width approximately equal to transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete, disk without sculpturing; scutellum without sculpturing behind transverse sulcus. Forewing without a membrane, veins not very distinct except at wing apex, with four apical cells of which the second is narrowed apically and the base of the outermost is more proximal than base of the third, texture translucent, apical margin very slightly concave. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer weakly produced, with a posteroventral concavity below a narrow dorsal lobe which bears a number of macrosetae and a short process that extends mesad but does not attain median line. Plates slender and triangular, not extending posteriorly as far as pygofer apex, with uniseriate macrosetae. Style slender, extending posteriorly much beyond apex of connective, narrowly rounded apically, without a preapical lobe. Connective short, Y-shaped, with arms not widely divergent. Aedeagus symmetrical, directed ventrally, with an unpaired basiventral and unpaired apicoventral process. Paraphyses absent.

Medlerola, new genus, is known only from the type-species, from French Guiana. It is closely related to *Diedrocephala* Spinola, but differs in lacking a carina at the transition from crown to face, in the more anterior location of

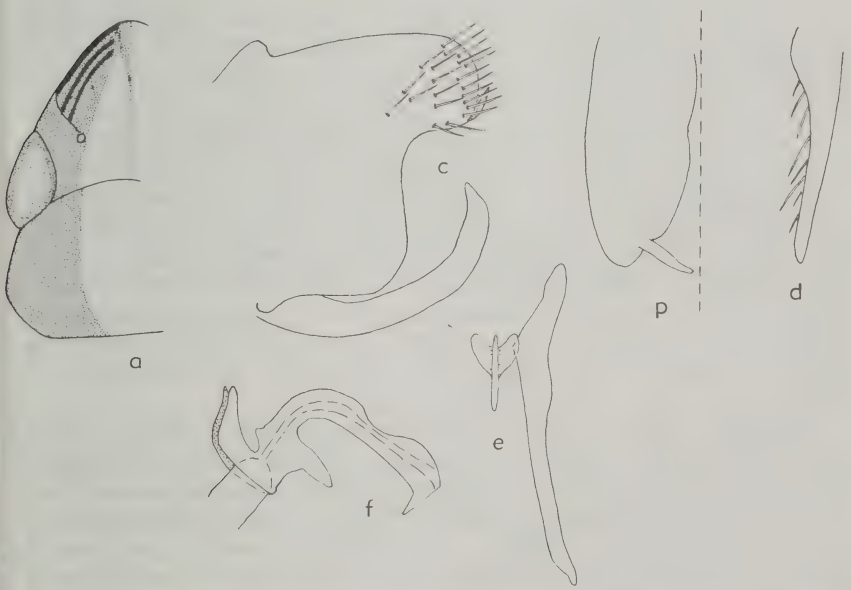


FIGURE 354.—*Medlerola motiva,* n. sp., holotype: *p,* Male pygofer apex, right side, from ventral view.

the ocelli, in the absence of an anteapical lobe on the style, in the presence of pygofer processes and the absence of paraphyses. The genus is named in honor of Dr. John T. Medler whose revisions of the genus *Erythrogonia* Melichar and *Agrosoma* Medler have been very helpful in the present study.

Medlerola motiva, NEW SPECIES

FIGURE 354

Structural characters as in generic description. Color of dorsum, including forewings, castaneous, with a median dorsal ivory vitta extending through pronotum and most of crown but with its slightly bifid anterior extremity occurring behind apex of crown; forewings with a transcommissural lobate ivory band at level of scutellar apex but not extending laterally much beyond claval suture on each forewing, and a triangular transverse pale mark extending from costal margin into inner apical cell near its base; face, propleura, and legs stramineous.

Holotype and two additional males and one specimen without abdomen, Maroni River, French Guiana (NCS). Holotype on indefinite loan to USNM.

63. RAMOSULUS, NEW GENUS

FIGURES 355-358

Type-species: *Cicadella corrugipennis* Osborn.

Length 4.1-5.9 mm.

Head weakly produced, median length of crown from slightly less than four-tenths to slightly less than six-tenths interocular width and from approximately one-fourth to slightly more than one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line or slightly closer to latter, crown with area between ocelli convex, without a median fovea and without sculpturing or setae; lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins rectilinear and vertical; clypeus flattened medially, muscle impressions not very distinct, face without pubescence, transclypeal suture complete or not medially, clypellus with contour either continuing profile of clypeus or curved more strongly and more nearly horizontal as a result.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk with a few transverse rugae on posterior portion. Forewing with membrane usually including all of apical cells except outer portion of outer apical cell (less extensive in *R. fulgidus* (Melichar)), some of veins indistinct, not elevated, with four apical cells of which base of the fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous but with two longitudinal translucent bands; forewings of

female in rest position exceeding apex of ovipositor. Hindwing with a small areolet distal to crossvein *r*. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of second and third tarsomeres and with two parallel longitudinal rows of very small setae on plantar surface.

Male pygofer strongly produced and with numerous macrosetae of uniform size, with apical spinelike structures or with a short apical process (dorsoapical process also present in *fulgidus*). Plates, short, triangular, not extending posteriorly nearly as far as pygofer apex, each with a few macrosetae that are uniseriate or nearly so. Styles truncate apically, not extending posteriorly farther than apex of connective. Connective Y-shaped with arms widely divergent. Aedeagus with shaft slender, elongate, with a median dorsoapical and a median ventroapical process (exception: *fulgidus*), both of which are slender, tapered and acute, gonopore dorsal, before dorsoapical process. Paraphyses narrowly U-shaped, or with an additional basal median process (*fulgidus*).

Female abdominal sternum VII moderately produced, posterior margin broadly convex. Dorsal wall of genital chamber without sclerites. Ovipositor with first valvulae extending unusually far anteriorly compared to most other cicadelline genera; second valvula broadened in most of portion beyond basal curvature, with sloping quadrate primary teeth, each bearing minute secondaries on broadened portion, apex acute, with anteapical dorsal and ventral denticles. Pygofer with macrosetae irregularly arranged over most of surface.

All of the species of *Ramosulus* are red and black.

Ramosulus ranges from northeastern to northwestern Brazil, Colombia, Ecuador, Peru, and Bolivia. The species are similar in appearance to species of *Soosiulus,* new genus, but the form of the aedeagus of *Ramosulus* is distinct from that found in *Soosiulus* (except in *S. ruber,* new species), and in the females the acute apices of the second valvulae and the setal pattern of the pygofer are distinctive in *Ramosulus*. Also, species of *Soosiulus* lack the small areolet in the hindwing described above for *Ramosulus*.

My interpretation of *Cicadella corrugipennis* Osborn is based on a study of a type-series ("type" and four paratypes) from the Carnegie Museum.

The lectotype of *Cardioscarta fulgida* Melichar agrees with figure 356.

I am pleased to name this genus in honor of Dr. J. A. Ramos whose work has helped our understanding of the auchenorrhynchous Homoptera.

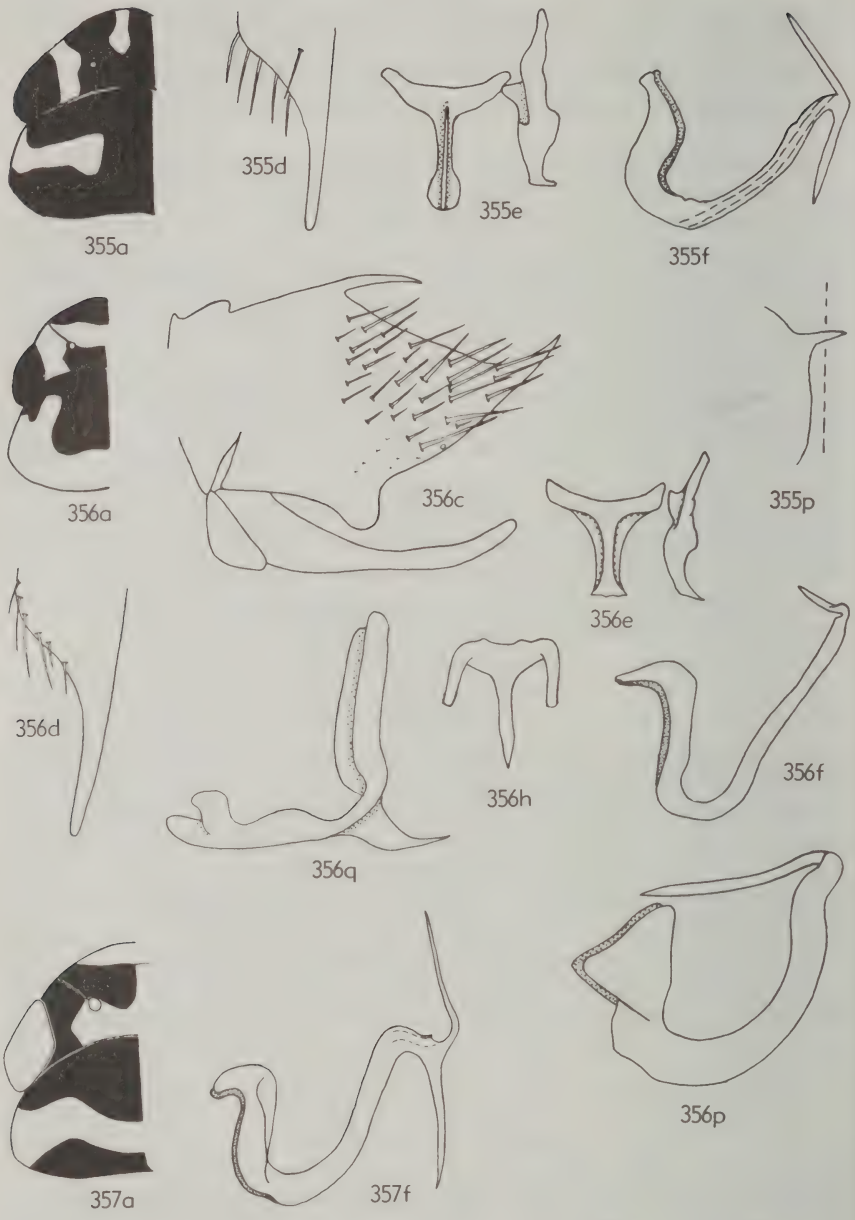
SPECIES OF *RAMOSULUS*

bakeri, n. sp. N. and SW. Brazil.

corrugipennis (Osborn), 1926a:204 *(Cicadella).* NE. and NW. Brazil, Ecuador, Peru, Bolivia. New combination.

fulgidus (Melichar), 1932a:296 *(Cardioscarta).* Peru. New combination.

phaedrus, n. sp. Peru.



FIGURES 355-357.—355, *Ramosulus phaedrus*, n. sp., holotype: *p*, Male pygofer apex, left side, from caudal view. 356, *R. fulgidus* (Melichar) (*p*, *q*, from specimen from Callanga, Peru; remainder from Peru; *h* from dorsal view): *p*, Aedeagus from lateral view; *q*, paraphyses from lateral view. 357, *R. bakeri*, n. sp., holotype.

KEY TO SPECIES OF *RAMOSULUS*

1. Clypellus with its lower portion pale; pronotum with a complete transverse band of orange or yellow 2
   Clypellus black on its lower portion; pronotum with an interrupted transverse band of orange ..... *phaedrus,* n. sp.
2. Pronotal transverse band with an anterior extension on each side; aedeagus with a single apical process ..... *fulgidus* (Melichar) (fig. 356)
   Pronotal transverse band without such an extension; aedeagus with two apical processes 3
3. Transverse pronotal band bisinuous; male pygofer with a short apical process on each side ..... *bakeri,* n. sp.
   Transverse pronotal band regularly curved; male pygofer without apical processes, with a cluster of spinelike structures
   corrugipennis (Osborn) (fig. 358)

Ramosulus phaedrus, NEW SPECIES

FIGURE 355, PAGE 440

Length of male 5.0-5.1 mm, of female 5.3-5.4 mm. Head with median length of crown slightly less than six-tenths interocular width and approximately one-third transocular width, clypellus with contour of its lower portion more nearly horizontal than profile of clypeus. Male pygofer with a short apical process directed mesally and crossing median line.

Color of crown, pronotum, and scutellum black with a median apical stripe on crown before ocelli, and ocellocular areas to posterior margin, orange; pronotum with a transverse orange band at midlength, interrupted mesally and extending anteriorly at each lateral extremity to end behind eye; scutellum with a pair of very small orange spots at midlength; clavus orange bordered with smoky, corium smoky translucent with costa narrowly black, and with an elongate narrowly angular orange pattern arising at base, the arms extending as far as apical cells; face black with median stripe on clypeus (continuation of median stripe of crown) and antennal ledges, orange; pleura and abdominal venter black, legs dark brown.

Holotype male and two females, Colombia, 1941 (L. Richter) (NCS). One male and one female, Pandi, Cundinamarca, Colombia, October 5, 1913 (W. Fritsche) (ZIMH). Holotype on indefinite loan to USNM.

Ramosulus phaedrus is closely related to *R. bakeri,* n. sp., but may be separated from it easily by the characters used in the key.

Ramosulus bakeri, NEW SPECIES

FIGURE 357, PAGE 440

Length of male 4.1-4.4 mm, of female 4.6-4.8 mm. Head with median length of crown from slightly less than one-half to almost six-tenths interocular width, and usually one-third or less transocular width, clypellus

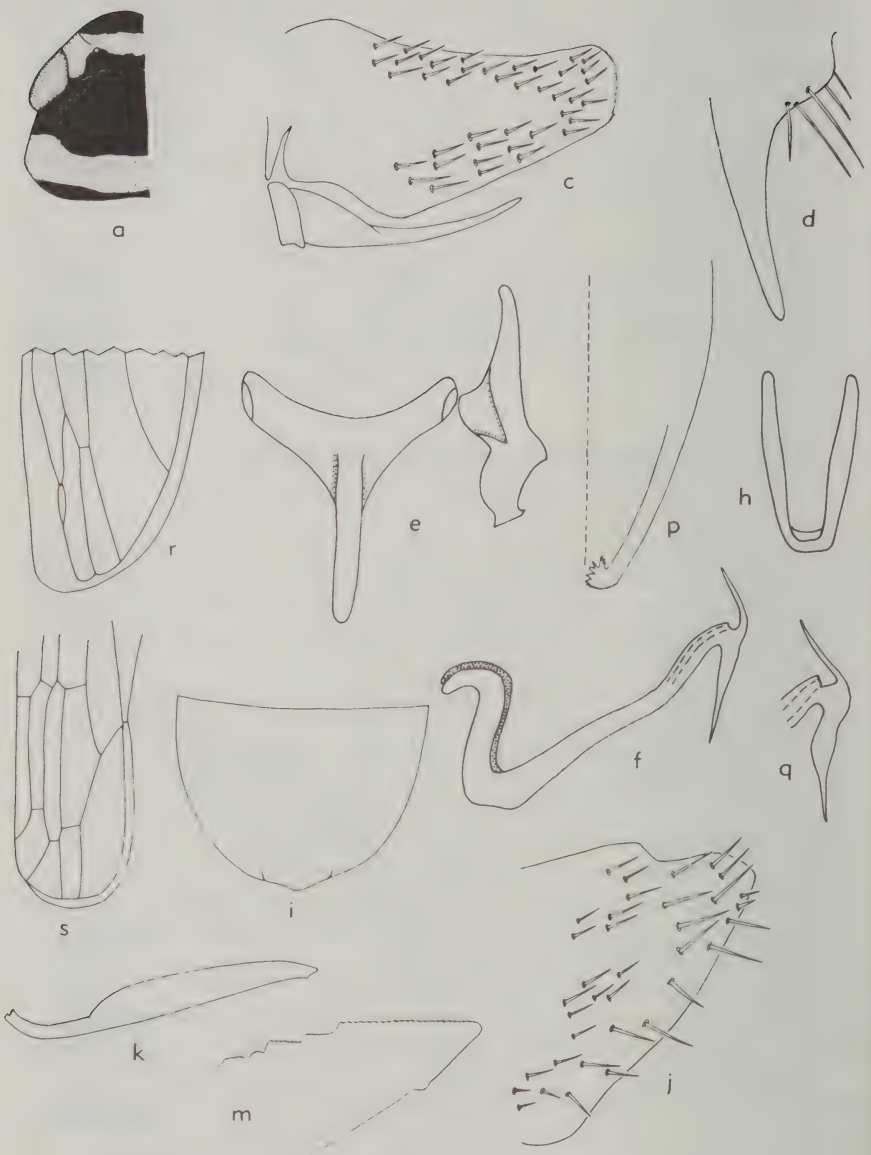


FIGURE 358.—*Ramosulus corrugipennis* (Osborn) (*d-f, h,* from paratype from Napo-Pastaza Province, Ecuador; *i-k, m,* from same locality; remainder from Ecuador; *h* from caudal view): *p,* Male pygofer apex, right side, from dorsal view; *q,* aedeagal apex from lateral view; *r,* hindwing; *s,* forewing.

with contour continuing profile of clypeus. Male pygofer as in *Ramosulus phaedrus,* n. sp. (above); aedeagus more strongly curved before its apex (fig. 357*f*) than other species in the genus.

Color of crown, pronotum, and scutellum black, with a half-rectangular orange pattern on crown enclosing a median black basal rectangular spot, pronotum with an inverted shallowly W-shaped transverse orange stripe across middle, scutellum with a small lateral orange spot at each extremity of the transverse depression, forewings colored as in *phaedrus;* face, above, and mesothorax, black, lower portion of face dull tan and concolorous with remainder of pleura, venter, and legs.

Holotype and two additional males, "Chapada", Brazil, November; one female, same data except "January"; one male and two females, same data except "April"; two females, same data except "May"; three females, same data except "August", all from C. F. Baker collection (USNM). One male, Pará, Brazil, September, 1935 (G. V. Vredenburg) (BM). The species is named in honor of C. F. Baker who made major contributions to the classification of the auchenorrhynchous Homoptera.

Ramosulus bakeri can be separated from the other species of the genus by the characters in the key and in the male by the apical curvature of the aedeagus in lateral view.

64. Genus JULIACA Melichar

Figures 359-388

Juliaca Melichar, 1926a:344. Type-species: *Microgoniella naevula* Melichar, by present designation.

Microscita Melichar, 1951a:93. Type-species: *Microgoniella naevula* Melichar, by subsequent designation of Metcalf, 1965a:90. New synonymy.

Length 4.4-9.1 mm.

Head with proportions quite variable, median length of crown from four-tenths to more than eight-tenths interocular width and from one-fourth to one-half transocular width, anterior margin usually rounded in dorsal view, without a carina at transition from crown to face (exception: some specimens of *J. satelles* (Fowler)), ocelli variable in location, most often equidistant from median line of crown and adjacent anterior eye angle, crown with or without a transverse concavity before ocelli, shallow when present, lateral clypeal sutures extending onto crown, attaining ocelli or not; antennal ledges in lateral view with anterior margins either rectilinear and vertical or oblique and slightly convex; clypeus varying interspecifically from convex to flattened medially, muscle impressions distinct or not (varying interspecifically), face without distinct pubescence, transclypeal suture interrupted medially, clypellus slightly swollen or not (strongly swollen in *J. dorsisignata* (Melichar)), its profile continuing profile of clypeus or not.

Thorax with pronotal width usually approximately equal to transocular width of head, in some species distinctly wider, lateral margins convergent anteriorly, dorsopleural carina distinct and usually extending as far anteriorly as eye margin, posterior margin slightly concave, disk with or without weak

transverse rugae (variable interspecifically); scutellum transversely striate or not (variable interspecifically) behind transverse sulcus. Forewing with membrane usually not distinct, bases of anteapical cells more proximal than claval apex, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture varying interspecifically, without sculpturing. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin convex, with macrosetae on apical half (restricted in *J. deanna,* n. sp.), without

FIGURES 359-362.—359, *Juliaca peragilis* (Melichar), lectotype. 360, *J. dorsisignata* (Melichar), lectotype. 361, *J. ornatula* (Melichar), lectotype. 362, *J. suturalis* (Melichar), lectotype.

processes (except in *deanna*). Plates slender, triangular, usually extending posteriorly as far as or farther than pygofer apex, with uniseriate macrosetae, with microsetae variously distributed. Style extending posteriorly as far as, or farther than apex of connective, without preapical lobe, apex variable interspecifically. Connective Y- or V-shaped with arms widely divergent. Aedeagus symmetrical, without processes (exception: *J. peragilis* (Melichar)), in most species with shaft slightly decurved in lateral view. Paraphyses present or absent, symmetrical when present and usually biramous.

Female abdominal sternum VII variable interspecifically, but with posterior margin produced posteriorly to some extent in all species where female is known. Second valvula of ovipositor broadened and with dorsal margin bearing primary teeth through most of its length, most of the primaries slanted and bearing secondaries, except at basal portion of toothed portion where, in some species, the teeth are triangular and without secondaries, apex varying interspecifically, either acutangular or bluntly rounded; anteapical denticles present at least dorsally. Pygofer angular or angulate posterodorsally in lateral view, chaetotaxy varying interspecifically.

Specimens belonging to the new genus *Juliaca* have been seen from Mexico to Bolivia, Venezuela, and southern Brazil. *Juliaca* and *Mesogonia* Melichar are closely related genera, and form an impressive part of the leafhopper fauna of the Neotropical Region even at this early stage in our knowledge. *Juliaca* species differ from most species of *Mesogonia* in lacking a carina slightly behind the anterior margin of the head in dorsal view, and in that the lateral clypeal sutures extend over the anterior margin onto the crown in all species (seldom so in *Mesogonia*). The male plates of species of *Juliaca* usually extend posteriorly as far as or farther than the pygofer apex; they usually do not extend as far posteriorly as the pygofer apex in *Mesogonia*. The styles of the males of *Mesogonia* species often extend much farther posteriorly than the apex of the connective; only slightly more posteriorly in *Juliaca*. *Juliaca* is also close to the new genera *Fusigonalia* and *Geitogonalia* in the discussions of which distinguishing characters are treated.

JULIACA GENERIC GROUP

65. Subrasaca
64. Juliaca
72. Beirneola
73. Fusigonalia
66. Mesogonia
67. Rotigonalia
68. Geitogonalia
69. Plerogonalia
70. Scopogonalia
71. Cyclogonia
78. Tylozygus
92. Sibovia

There has been no valid type-species selection for *Juliaca* Melichar, to date. The nominal species listed by Evans (1947a:162) as type-species is a *nomen nudum*. It is the species described below as *J. melichari,* n. sp. I have selected *Microgoniella naevula* Melichar because two of the four species originally included by Melichar in his *Microgoniella* subgenus *Microscita* fit *Juliaca* in the sense of Evans and Melichar. Under Article 13 section (b) of the International Rules, *Microscita* Melichar is not an available name regardless of subsequent actions.

My interpretation of *Microgoniella bilineata* Melichar is based on a specimen from Callanga, Peru, from MMB, determined by Melichar. The male genitalia are like *Juliaca huasima,* n. sp.

The male lectotype of *Tettigoniella scapula* Jacobi has been dissected (fig. 370) and found to be the same as the male lectotype of *Tettigonia carbuncula* Breddin, which was also dissected.

I have seen a single male of *Microgoniella cinctella* Melichar from MMB, possibly the only specimen studied by Melichar. The genitalia had been prepared and placed in separate pieces in a dry glass vial, and were very difficult to handle. Because the pygofer and plates are close to *Juliaca simoni,* n. sp., and because the anterior dorsum is very near *J. huasima,* n. sp., I have placed it in *Juliaca* but have not designated the specimen lectotype in the hope that there may be more (and better) specimens eligible.

I have seen the female lectotype of *Tettigonia collata* Fowler (fig. 388). Medler placed this species in *Erythrogonia* Melichar, but his illustration does not fit the lectotype, although I think the illustration also belongs in *Juliaca,* perhaps *chapini,* n. sp., below.

I have seen a single male of *Microgoniella dorsigutta* Melichar from MMB. The male genitalia are like *chapini.*

M. dorsisignata Melichar is placed in *Juliaca* on the basis of an examination of the lectotype and one additional female.

I have seen only the female lectotype of *Cardioscarta homalina* Melichar. It is placed in *Juliaca* because of the form and of color pattern of the forewings, both suggesting a relationship to a variety of *J. pergrata* (Melichar) from Colombia.

The present interpretation of *Tettigonia lepida* Signoret is based on a study of the lectotype which agrees with figure 376, but with the paraphyses symmetrical. *Tettigoniella espriella* Distant is placed in synonymy under *lepida* as a result of the similarity of the Distant holotype to a sketch of the anterior dorsum of a specimen from Itaituba, Brazil. Melichar first synonymized these names in 1951.

A male from the type-series of *Cicadella limboclavula* Osborn is presently selected as lectotype. It bears labels: "Chulumani/Bolivia, Dec. 9, '98" and "Holotype/Cicadella/limboclavula/Osborn" and "9020♂" and "Herbert/Osborn/Collection" and "Cicadella/limboclavula/Osb.". The specimen is in OSU. I have studied the male lectotype of *Microgoniella obstinatula* Melichar.

The lectotype of *Microgoniella naevula* has been studied (fig. 363).

I have seen three specimens of *Microgoniella ornatula* Melichar, loaned by MMB. I select a male as lectotype. It bears labels: "Alto de las/cruces" and

"ornatula/M./det. Melichar." The aedeagus is illustrated in figure 361*f*. The other genital characters are as in the illustration of *Juliaca naevula* (Melichar).

The female lectotype of *Tettigoniella pedisequula* Jacobi has the anterior dorsum much like figure 374*a*. I have placed *Microgoniella elegans* Melichar in synonymy after study of a male of the type-series from Marcapata, Peru.

The present interpretation of *Cardioscarta peragilis* Melichar is based on a study of the lectotype.

I have identified *Cardioscarta pergrata* Melichar in the sense of the lectotype and a Melichar-determined specimen (HNHM). It is very close to *Juliaca cruenta,* n. sp. (see description below). The anterior dorsum (not illustrated) is like *cruenta* (fig. 369*a*), but the scutellum is entirely black.

My identification of *Tettigoniella quadrigula* Jacobi is based on a study of the male lectotype. The genitalia, not illustrated here, are like the illustration of *J. pergrata* (Melichar) (fig. 366). I placed *dilutula* Melichar in synonymy after an examination of a specimen from Rioja, Peru, type locality of both nominal species, and possibly the holotype of *dilutula.*

My identification of *Tettigonia satelles* Fowler is based on an examination of the female lectotype and a comparison with a drawing of a Costa Rican specimen made earlier.

The lectotype of *Tettigoniella sertigerula* Jacobi has been studied and is illustrated (fig. 384*a*).

I have seen only a single female of *Microgoniella striatella* Melichar determined by Melichar, and it was not at hand when the key to species was written.

The genitalia of the male lectotype of *Microgoniella suturalis* Melichar are much as in the present illustration of *Juliaca pergrata* (Melichar) (fig. 366).

I have examined the "type" (holotype) of *Cicadella tigrinula* Osborn.

A male of *Cicadella transversula* Osborn is presently designated as lectotype. It bears labels: "Chulumani/Bolivia/Nov. 20, '98" and "9015♂" and "Holotype/Cicadella/transver-/sula/Osborn" and "Herbert/Osborn/Collection" and "Cicadella/transversula/n.sp./Osb.". The genitalia are almost identical to my illustration of *Juliaca tigrinula* (Osborn) (fig. 373).

SPECIES OF *JULIACA*

aureocincta, n. sp. Peru.
bilineata (Melichar), 1951a:97 (*Microgoniella*). Peru. New combination.
carbuncula (Breddin), 1901e:90 (*Tettigonia*). Ecuador, Peru, Bolivia. New combination.
  scapula (Jacobi), 1905c:180 (*Tettigoniella*). New synonymy.
chapini, n. sp. Colombia, S. Brazil.
cinctella (Melichar), 1951a:97 (*Microgoniella*). Peru. New combination.
clandestina, n. sp. Bolivia.
collata (Fowler), 1900a:261 (*Tettigonia*). Panama. New combination.
cruenta, n. sp. Peru.
deanna, n. sp. Ecuador, Peru.
dorsigutta (Melichar), 1951a:102 (*Microgoniella*). Peru. New combination.
dorsisignata (Melichar), 1951a:111 (*Microgoniella*). Bolivia. New combination.
furtiva, n. sp. Peru.
homalina (Melichar), 1932a:295 (*Cardioscarta*). Peru. New combination.

huasima, n. sp. Peru.
kelainops, n. sp. Peru.
lepida (Signoret), 1855d:775 *(Tettigonia).* Peru, Brazil. New combination.
espriella (Distant), 1908a:524 *(Tettigoniella).*
limboclavula (Osborn), 1926b:214 *(Cicadella).* Peru, Bolivia. New combination.
obstinatula (Melichar), 1951a:101 *(Microgoniella).* New synonymy.
melichari, n. sp. Venezuela.
mimula, n. sp. Paraguay, Bolivia (?), Venezuela (?).
naevula (Melichar), 1951a:110 *(Microgoniella).* Colombia. New combination.
ornatula (Melichar), 1951a:111 *(Microgoniella).* Colombia. New combination.
pedisequula (Jacobi), 1905c:178 *(Tettigoniella).* Colombia, Peru. New combination.
elegans (Melichar), 1951a:101 *(Microgoniella).* New synonymy.
peragilis (Melichar), 1932a:295 *(Cardioscarta).* Colombia. New combination.
pergrata (Melichar), 1932a:298 *(Cardioscarta).* Colombia, Peru, Brazil. New combination.
phalacra, n. sp. Colombia.
pulla, n. sp. Panama.
quadrigula (Jacobi), 1905c:183 *(Tettigoniella).* Ecuador, Peru. New combination.
dilutula (Melichar), 1951a:103 *(Microgoniella).* New combination.
satelles (Fowler), 1900d:288 *(Tettigonia).* Mexico, Costa Rica, Panama, Colombia. New combination.
scalarum, n. sp. Colombia, Peru.
sertigerula (Jacobi), 1905c:180 *(Tettigoniella).* Ecuador, Peru, Bolivia. New combination.
simoni, n. sp. Peru.
striatella (Melichar), 1951a:105 *(Microgoniella).* New combination.
suturalis (Melichar), 1951a:110 *(Microgoniella).* Colombia. New combination.
tigrinula (Osborn), 1926b:217 *(Cicadella).* Bolivia. New combination.
transversula (Osborn), 1926b:218 *(Cicadella).* Bolivia. New combination.
vargasi, n. sp. Venezuela, Peru, Bolivia.

KEY TO MALES OF *JULIACA*

(*J. collata* (Fowler) (fig. 388) not included)

1. Male with papilioniform processes arising laterally on shaft of aedeagus near its midlength, directed ventrally
peragilis (Melichar) (fig. 359)
Not as above 2

2. Clypellus obtusangular in lateral view; dorsum with a median longitudinal yellow vitta extending from claval apex forward over scutellum and pronotum onto crown ..... *dorsisignata* (Melichar) (fig. 360)
Clypellus rarely angular; usually without a median longitudinal vitta on dorsum, not extending onto pronotum when present 3

3. Clypeus obtusangular in lateral view; aedeagus with dorsal margin convex in lateral view ..... *ornatula* (Melichar) (fig. 361)
Without above combination of characters 4

4. Anterior dorsum black with a narrow transverse pale stripe on pronotum and a median sutural pale stripe on forewings in repose
suturalis (Melichar) (fig. 362)
Not so marked 5

5. Pronotal width distinctly greater than transocular width of head; male (unknown in *striatella* (Melichar)) pygofer with numerous macrosetae occurring on at least apical half 6
Pronotal width approximately equal to transocular width of head; male pygofer with setae usually less numerous and restricted to more apical portion 14

6. Scutellum entirely black 7
Scutellum at least partly pale 10

7. Crown with three orange spots or an orange band
striatella (Melichar)
pergrata (Melichar) (fig. 366)
Crown without orange markings 8

8. Forewings with a large transcommissural pale spot 9
Forewings each with a pale spot in corium
phalacra, n. sp., page 465

9. Male pygofer with length not much greater than width; aedeagus broadest in apical half of shaft; plates with macrosetae in a single short row near midlength ..... *deanna,* n. sp., page 465
Male pygofer with length much greater than width; aedeagus of uniform width throughout length of shaft; plates with uniseriate macrosetae extending through their full length
naevula (Melichar) (fig. 363)

10. Face with at least clypeus and clypellus black 11
Face pale except at upper marginal area 12

11. With a transverse pale band including scutellum
kelainops, n. sp., page 454
Without a conspicuous transverse pale band behind pronotum
quadrigula (Jacobi) (fig. 365)

12. Male with length of aedeagal shaft not more than three times greatest width ..... *aureocincta,* n. sp. page 452
Male with length of aedeagal shaft greater than three times its greatest width 13

13. With a transverse orange band across scutellum and forewings; crown and pronotal markings yellow to orange ..... *simoni,* n. sp. page 455
Without such a transverse band; crown and pronotal markings red
cruenta, n. sp., page 456

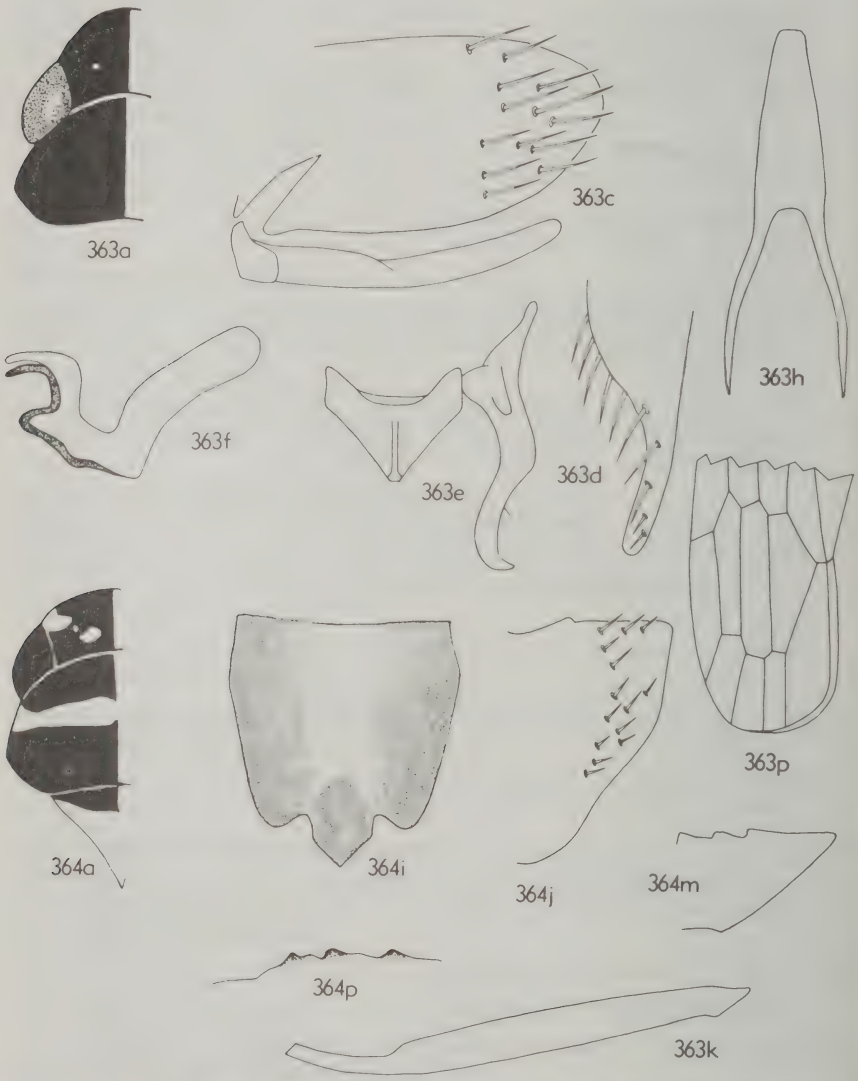
14. Length of male 7.1 mm or more 15
Length of male less than 7.1 mm 23

15. Crown, pronotum, and scutellum black, unmarked
carbuncula (Breddin) (fig. 370)
Anterior dorsum with at least some pale markings 16

16. Forewings castaneous with a conspicuous orange spot near middle of each clavus ..... *furtiva,* n. sp. page 458
Not as above 17

17. Forewing black with strikingly pale longitudinal veins; scutellum dark with a number of pale markings ..... *mimula*, n. sp., page 459
Forewing and scutellum not marked as above 18

18. Crown mostly orange or yellow 19
Crown mostly black 20



FIGURES 363, 364.—363, *Juliaca naevula* (Melichar) (*p* from specimen from "Alto de las Cruces"; remainder from lectotype; *h* from dorsal view): *p*, apex of forewing. 364, *J. kelainops*, n. sp., topotype: *p*, Base of dorsal margin of second valvula of ovipositor.

19. Crown orange with a transverse black stripe (occasionally interrupted) of irregular width at middle; forewing without a longitudinal yellow marking crossing claval suture ..... *tigrinula* (Osborn) (fig. 373)
Crown yellow, without a transverse black stripe at midlength; forewing with a conspicuous longitudinal yellow stripe crossing, and interrupted by, claval suture ..... *pedisequula* (Jacobi) (fig. 374)

20. Forewing with a white or blue line parallel and near to humeral and commissural margins ..... *limboclavula* (Osborn)
Forewing without such a line 21

21. Forewing with claval suture margined with yellow 22
Forewing with claval suture not margined .... *clandestina*, n. sp., page 460

22. Crown with area of muscle impressions yellow, pronotum with a submarginal arc of four yellow spots near anterior margin, midpronotal transverse band interrupted ..... *transversula* (Osborn)
Crown with area of muscle impressions black, pronotum without submarginal spots, midpronotal transverse band not interrupted
lepida (Signoret) (fig. 376)

23. Forewings black or castaneous with a broad transcommissural white spot the principal marking 24
Forewings not so, if transcommissural spot is present then it is narrow, or yellow, or only part of a pattern of spots 26

24. Face white (Central American) ..... *satelles* (Fowler) (fig. 377)
Face black (Andean) 25

25. Forewings castaneous, head more angulate in dorsal view
dorsigutta (Melichar)
Forewing black, head less strongly angulate 9

26. Forewings with a spot in base of clavus not attaining commissural margin and a transcommissural spot at claval apex
melichari, n. sp., page 464
Forewings without such a color pattern 27

27. Forewings black without a transcommissural stripe, without longitudinal green markings 28
Forewings with one or more transcommissural stripes, or with longitudinal green markings, or orange with narrow oblique black lines ... 29

28. Forewings black, unmarked, except for a transparent angular costal spot extending into outer anteapical cell (Central America)
pulla, n. sp., page 462
Forewings black with an oblique pale vitta extending from costal margin posteromesad to claval apex and a second pale vitta extending from outer margin of inner apical cell obliquely posterolaterad to costal margin (both reduced to spots in one specimen) (Peru)
bilineata (Melichar)

29. Forewings orange with claval suture and a narrow parallel line in corium, black ..... *homalina* (Melichar) (fig. 380)
Forewings not as above 30

30. Forewings with clavus mostly green ..... *huasima*, n. sp., page 467
Forewings not so marked 31

31. Dorsum with no transverse pale markings other than a narrow band on posterior margin of pronotum ..... *cinctella* (Melichar)
Dorsum with more than one transverse pale band 32

32. Face black, species more slender, at least one of pale transverse transcommissural bands attaining costal margin
sertigerula (Jacobi) (fig. 384)
Face pale, species more robust, none of transverse transcommissural bands attaining costal margin 33

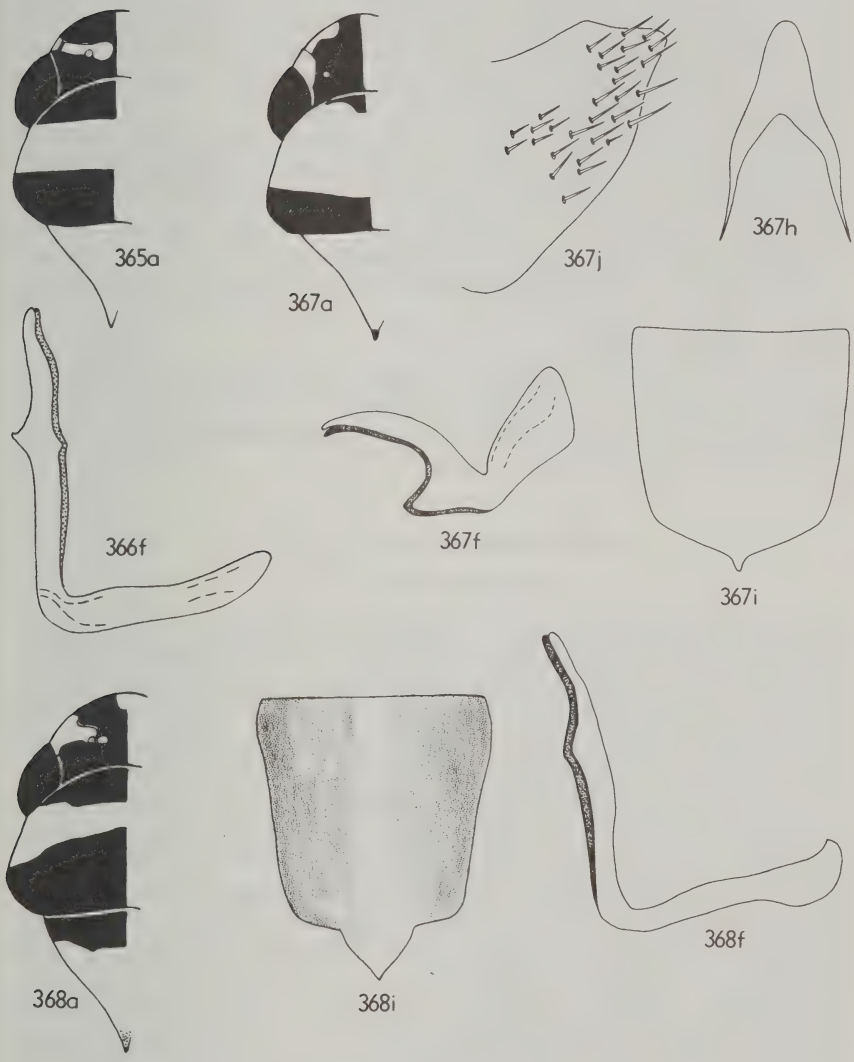
33. Forewing with an anteapical yellow costal spot
chapini, n. sp., page 468
Forewing without an anteapical costal pale spot 34

34. Male plates extending posteriorly farther than pygofer apex; female abdominal sternum VII without swollen areas
vargasi, n. sp., page 470
Male plates not extending posteriorly nearly as far as pygofer apex; female abdominal sternum VII with a swollen area on each side near posterior margin ..... *scalarum*, n. sp., page 472

Juliaca aureocincta, NEW SPECIES

FIGURE 367, PAGE 453

Length of male 6.1-6.3 mm, of female 6.4-6.8 mm. Head with median length of crown varying from slightly less than two-thirds to slightly more than seven-tenths interocular width and four-tenths or slightly less than four-tenths transocular width, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown without a transverse concavity before ocelli, lateral clypeal sutures not attaining ocelli; antennal ledges in lateral view with anterior margins rectilinear and vertical; clypeus convex, muscle impressions not distinct, clypellus with profile continuing profile of clypeus. Pronotal width approximately equal to transocular width of head, disk not rugose, scutellum not transversely striate behind transverse sulcus, forewings coriaceous. Male plates not extending posteriorly as far as pygofer apex, each with a row of macrosetae extending to apex; aedeagus with shaft very short, not decurved, shorter than dorsal apodemes, gradually broader distally, obliquely truncate apically; paraphyses present and biramous. Female abdominal sternum VII not keeled, posterior margin slightly produced, slightly angular at apex; second valvulae acute apically; pygofer angulate apically, with numerous macrosetae arising on posterior half and a few arising more proximally near middle of disk.



FIGURES 365-368.—365, *Juliaca quadrigula* (Jacobi) (from specimen from Abitagua, Ecuador). 366, *J. pergrata* (Melichar) (from specimen from Itaituba, Brazil). 367, *J. aureocincta*, n. sp. (*a, i, j*, from topotype; remainder from holotype; *h* from dorsal view). 368, *J. simoni*, n. sp. (*a, f*, from holotype; *i* from topotype).

Crown black with a broad undulant golden marking along each anterolateral margin; pronotum and scutellum golden with a black band of variable width along anterior pronotal margin and a broader black band along posterior margin, apex of scutellum black; forewing black with a broad costal orange to yellow band extending from base to near apex, a much narrower pale diagonal band in clavus and another similar band in corium; face, thoracic pleura, and legs, pale yellow to orange.

Holotype and three additional males, Chanchamayo, Peru, July 25, 1960 (J. Salazar and C. Ramirez); one male and six females, same data except collectors (D. Young and C. Ramirez); two males, same locality, July 22, 1960 (one by J. Salazar, one by C. Ramirez) (NCS). One male and one female, "Sinchono", Peru (D. M. DeLong collection, OSU). One male and one female, "Tambo Enenas", Camino del Pichis, Peru, July 4, 1930, and one male, Hacienda San Juan, Col. Perené, Peru, June 1930 (CU). Holotype on indefinite loan to USNM.

J. aureocincta, n. sp., is similar to *J. simoni*, n. sp. (below), from which it may be separated by its dark crown apex and in that the claval pale line of the forewing is more widely separated from the commissural margin, in addition to the characters used in the key.

Juliaca kelainops, NEW SPECIES

FIGURE 364, PAGE 450

Length of male 6.0-6.3 mm, of female 6.1-6.4 mm. Head with median length of crown varying from slightly less than one-half to slightly more than one-half interocular width and from one-fourth to one-third transocular width, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown without a transverse concavity before ocelli, lateral clypeal sutures attaining ocelli or nearly so; antennal ledges in lateral view with anterior margins rectilinear and almost vertical; clypeus convex, muscle impressions not very distinct, clypellus with profile continuing profile of clypeus. Pronotal width greater than transocular width of head, disk not rugose, scutellum not transversely striate behind transverse sulcus, forewings coriaceous. Male plates extending posteriorly as far as pygofer apex, each with row of macrosetae extending to apex; aedeagus with length of shaft approximately four-fifths length of dorsal apodemes (similar to aedeagus of *J. simoni*, n. sp., fig 368*f*); paraphyses reduced to a short sclerite beneath base of aedeagus, without rami. Female abdominal sternum VII keeled medially in dried specimens, medioapical portion flattened and produced in an obtusangular lobe; second valvulae acute apically; pygofer bluntly angulate at apex, with macrosetae sparse and occurring in a diagonal group parallel to posteroventral margin.

Crown and pronotum black, with an arcuate transverse band of four yellow or orange spots over ocelli, the lateral pair occasionally fused on each side of crown, pronotum with a narrow transverse orange or yellow band at

midlength; scutellum yellow or black basally, remainder yellow or orange; forewings at rest pale basally as far as scutellar apex, then dull yellow to orange as far as claval apex and with veins contrasting black, apical portions fumose; face black except antennal ledges which are yellow to orange, and marginal areas of genae which are yellow (yellow margin wider and extending onto clypeus in one female); thoracic pleura and legs yellow.

Holotype and seven additional females, and eight males, Chanchamayo, Peru, July 22, 1960 (J. Salazar); two males and three females, same locality, July 22, 1960 (J. Salazar and C. Ramirez); two males and two females, same locality, July 25, 1960 (D. Young and J. Salazar); five males and seven females, same locality, July 21, 1960 (J. Salazar) (NCS). One female, "Tambo Enenas to Dos de Mayo", Camino del Pichis, Peru, July 5, 1920 (Cornell U.). One male, "Peru" (HNHM). Holotype on indefinite loan to USNM.

J. kelainops, n. sp., is similar externally to *J. quadrigula* (Jacobi) but is smaller, and with the face black instead of pale as in *quadrigula.* It is also very near *J. simoni,* n. sp. (below), but differs in having a paraphysis in the male and in having the median posterior lobe of the female abdominal segment VII depressed.

Juliaca simoni, NEW SPECIES

FIGURE 368, PAGE 453

Length of male 6.3-6.9 mm, of female 6.8-7.1 mm. Head with median length of crown varying from slightly less than one-half to slightly more than one-half interocular width and from one-fourth to slightly less than one-third transocular width, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown with a shallow transverse concavity before ocelli, lateral clypeal sutures almost attaining ocelli; antennal ledges in lateral view with anterior margins oblique and slightly convex; clypeus narrowly flattened medially, muscle impressions not distinct, clypellus with profile of its lower portion slightly more nearly horizontal than contour of remainder of face. Pronotal width slightly greater than transocular width of head, disk not rugose, scutellum not transversely striate behind transverse sulcus, forewings coriaceous, with membrane distinct in paler variety (see color description below). Male plates extending posteriorly farther than pygofer apex, each with a row of macrosetae extending to apex; aedeagus with shaft slender and elongate for genus, almost as long as slender dorsal aedeagal apodemes, shaft weakly biundulate in lateral view, rounded apically but with a slight dorsoapical lobe. Paraphyses absent. Female abdominal sternum VII not keeled in dried specimens, posterior margin as in *J. kelainops,* n. sp. (above), except that median posterior lobe is not depressed or flattened; second valvulae as in *kelainops;* pygofer much as in *J. aureocincta,* n. sp. (fig. 367*j*).

Crown black with an apical spot and a marginal spot before each eye yellow to orange, the latter variable in width and extending to ocellus, often

with a small round pale spot on each side mesad of and near each ocellus; pronotum black with a transverse band varying greatly in width, pale yellow to orange; scutellum yellow or orange with or without a basal black band (variable in width when present), apex dark; forewing dark with a transverse basal stripe, a narrow longitudinal band in clavus parallel to commissural margin, and a similar band in corium bordering claval suture, and in darker specimens with a similar band parallel to costal margin in basal half of wing yellow to orange (in teneral specimens costal area broadly hyaline and without this band); face, thoracic pleura, and legs, pale yellow.

Holotype and ten additional males and eleven females, Chanchamayo, Peru, July 25, 1960 (Young and Salazar); one male and one female, same data except date which is July 21, 1960; one female typotype, July 22, 1960 (J. Salazar); one female, same data as last preceding except collector (C. Ramirez), and one female with same data except collectors (Young and Salazar); seven male and 19 female topotypes, July 25, 1960 (Young and Salazar); and six males and one female, same data as preceding except collectors (Young and Ramirez); five males, Santa Isabel, Cuzco, Peru, December 31, 1951 (F. Woytkowski); one male, same data as preceding except January 2, 1952; one male, Cuzco, Peru, June 26, 1952 (F. Woytkowski) (NCS). One male (USNM) and one female (RMS), Callanga, Peru. One male, "Tambo Enenas to Dos de Mayo", Camino del Pichis, Peru, July 5, 1920 (Cornell U.). Two males, Monsón Valley, Tingo María, Peru, October 21, 1954; (E. I. Schlinger and E. S. Ross); 38 males, same data as preceding except October 26, 1954 (CAS). Holotype on indefinite loan to USNM.

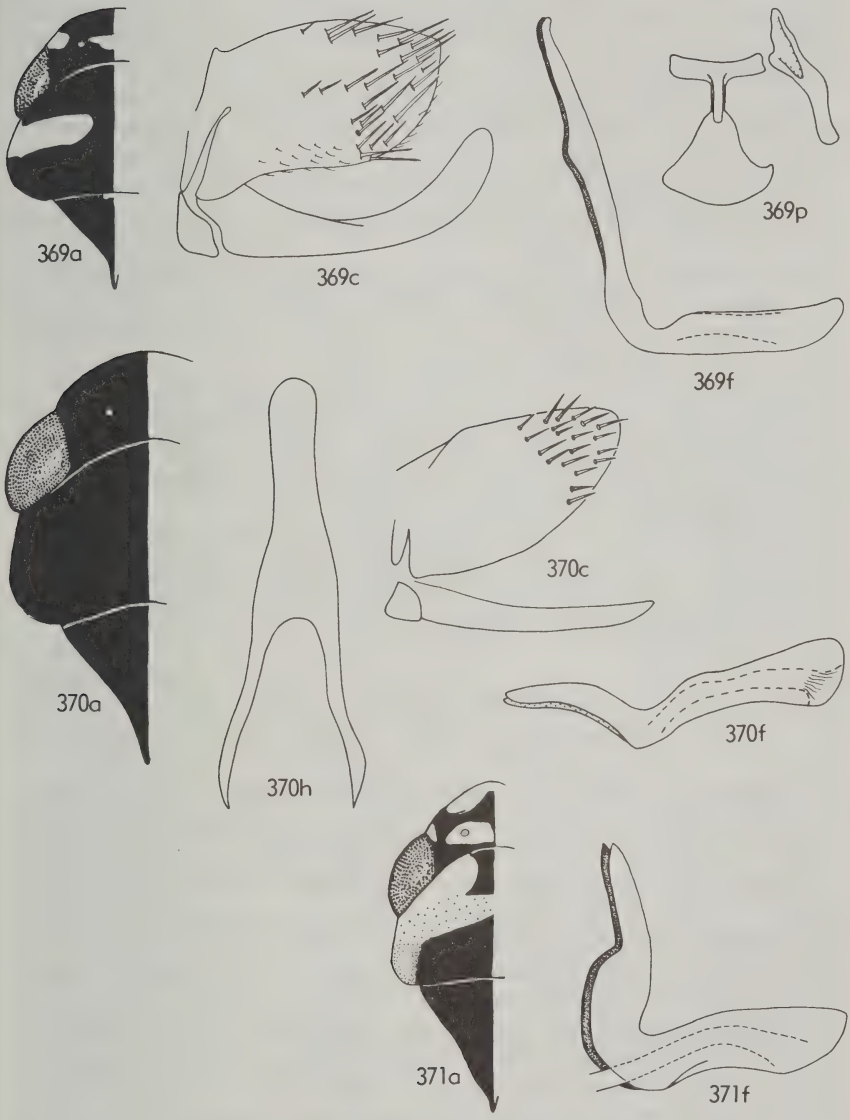
I am happy to name this species for my friend, Ingeniero Juan Simón, of the Estación Experimental at La Molina, Peru, who spared no effort to help with planning and carrying out collecting activities in Peru in 1960.

J. simoni, n. sp., is closely related to *J. kelainops*, n. sp. (above), in the treatment of which distinguishing characters are discussed.

Juliaca cruenta, NEW SPECIES

FIGURE 369, PAGE 457

Length of male 6.4-6.8 mm, of female 6.4-6.7 mm. Head with median length of crown slightly more than four-tenths interocular width and one-fourth transocular width or slightly more, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each slightly closer to median line than to adjacent anterior eye angle, crown without a transverse concavity before ocelli, lateral clypeal sutures not attaining ocelli; antennal ledges in lateral view with anterior margins rectilinear and vertical; clypeus convex, muscle impressions not distinct, clypellus with profile a continuation of that of clypeus. Pronotal width greater than transocular width of head, disk weakly transversely rugose, scutellum transversely striate behind transverse sulcus, forewings coriaceous. Male plates extending posteriorly farther than pygofer, each with row of macrosetae extending to apex; aedeagus with shaft not very short, but not nearly as long as elongate dorsal



FIGURES 369-371.—369, *Juliaca cruenta,* n. sp., holotype: *p,* Style, connective, and paraphysis, from dorsal view. 370, *J. carbuncula* (Breddin) (from lectotype of *Tettigoniella scapula* Jacobi; *h* from dorsal view). 371, *J. furtiva,* n. sp., holotype.

apodemes, apex oblique and rounded; paraphyses represented by a median triangular sclerite. Female abdominal segment VII keeled medially, posterior margin as in *J. simoni*, n. sp. (above); second valvulae acute apically; pygofer angulate apically, with numerous macrosetae in a group parallel to posteroventral margin.

Crown, pronotum, and scutellum black, with a large spot before each eye and a median discal spot on crown, red; pronotum with an interrupted transverse red stripe at midlength; scutellum with a small median red spot at middle of anterior margin; forewing with clavus black, a yellow to orange stripe near and parallel to humeral margin and commissural margins to or beyond midlength of latter, confluent at its base with a similar pale line on corium bordering claval suture and extending posteriorly at its apex along base of inner apical cell, remainder of corium smoky translucent, with a yellow stripe, more or less distinct, extending along costa through more than half length of latter; face, thoracic pleura, venter, and legs, yellow.

Holotype male and nine females, Chanchamayo, Peru, July 22, 1960 (J. Salazar); three males and six females, same data as preceding except collectors (J. Salazar and C. Ramirez); two female topotypes, July 21, 1960 (Young and Salazar); one female topotype, same data except collector (J. Salazar) (NCS). Holotype on indefinite loan to USNM.

Externally, *J. cruenta*, n. sp., is very close to *J. striatella* (Melichar) (known to me only from female), but differs in the pale face which is black in the Melichar species. It is also close to *J. pergrata* (Melichar) which also has a black face and lacks a spot on the scutellum.

Juliaca furtiva, NEW SPECIES

FIGURE 371, PAGE 457

Length of male 7.5-7.9 mm. Head with median length of crown approximately six-tenths interocular width and one-third transocular width, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, crown without a transverse concavity before ocelli, lateral clypeal sutures not attaining ocelli, antennal ledges in lateral view with anterior margins oblique and convex; clypeus flattened medially, muscle impressions distinct, clypellus with profile continuing profile of clypeus except for a slightly more convex portion in basal half. Pronotal width approximately equal to transocular width of head, disk weakly transversely rugose, scutellum not transversely striate behind transverse sulcus, forewings coriaceous. Male plates extending as far posteriorly as pygofer apex; aedeagus with shaft not elongate, but longer than basal apodemes, slightly decurved, apex oblique and convex; paraphyses present and biramous. Female unknown.

Crown black with a castaneous marginal spot on each side of apex, with a transverse orange stripe, interrupted at middle, across ocelli; pronotum with ground color castaneous except median portion which is broadly black, with a narrow transverse orange line at midlength; scutellum black; forewing castaneous, with a large orange spot at midclavus (absent in one specimen), a

narrow orange stripe parallel to costa, a similar longitudinal stripe in apical half of corium, but interrupted near midlength of stripe; with or without an orange stripe bordering claval suture and another near and parallel to humeral and commissural margins; face black except brown area over muscle impressions and antennal ledges, an orange angular spot beneath each eye; thoracic pleura black, marked with orange; legs sordid tan.

Holotype and two additional males, Peru (RMS). One male, Pozuzo, Peru (Schaufuss) (MMB).

J. furtiva, n. sp., is very similar to *J. clandestina,* n. sp., from which it may be separated by its shorter aedeagal shaft and different markings.

Juliaca mimula, NEW SPECIES

FIGURE 372, PAGE 460

Length of male 7.3-7.6 mm, of female 8.0-8.3 mm. Head with median length of crown varying from slightly less than six-tenths to almost two-thirds interocular width and from approximately one-third to four-tenths transocular width, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown with a shallow transverse concavity before ocelli, lateral clypeal sutures not attaining ocelli; antennal ledges in lateral view with anterior margins rectilinear and oblique; clypeus convex, muscle impressions distinct, clypellus continuing profile of clypeus except for a slightly swollen portion near base. Pronotal width approximately equal to transocular width of head, disk not rugose, scutellum not transversely striate behind transverse sulcus, forewings coriaceous with a terminal membrane. Male plates extending posteriorly farther than pygofer apex; aedeagus much as in *J. pedisequula* (Jacobi) (fig. 374*f*); paraphyses biramous. Female abdominal sternum VII keeled in apical portion, with a broad median posteriorly produced portion that is subdivided into a median and two lateral lobes, and with a shorter lateral lobe on each side; second valvulae rounded apically (as in *pedisequula,* fig. 374*m*); pygofer angular apically, with a number of macrosetae parallel to posterior and posteroventral margin.

Crown tan, with muscle impressions, a marginal line before each eye, and a few small markings at apex, black; pronotum concolorous with crown, with anterior and posterior margins narrowly black; scutellum black with two transverse rows of tan markings and with a trilobate apical pale marking; forewing black with costal margin, longitudinal veins, humeral and commissural margins, yellow, with shorter linear yellow markings at bases of apical cells, membrane smoky; clypeus with black arcs on region of muscle impressions continuous with black median clypeal area which is continuous with black clypellus, lateral portions of clypeus and remainder of face dull yellow except a black line along posterior margin of each gena below eye; thoracic pleura yellow marked with black, venter of thorax black, legs dull yellow.

Holotype male and two females, "Hohenau", Paraguay; one male and one female, Villa Elvira, Paraguay; one female, "Paraguay"; one female, Rio

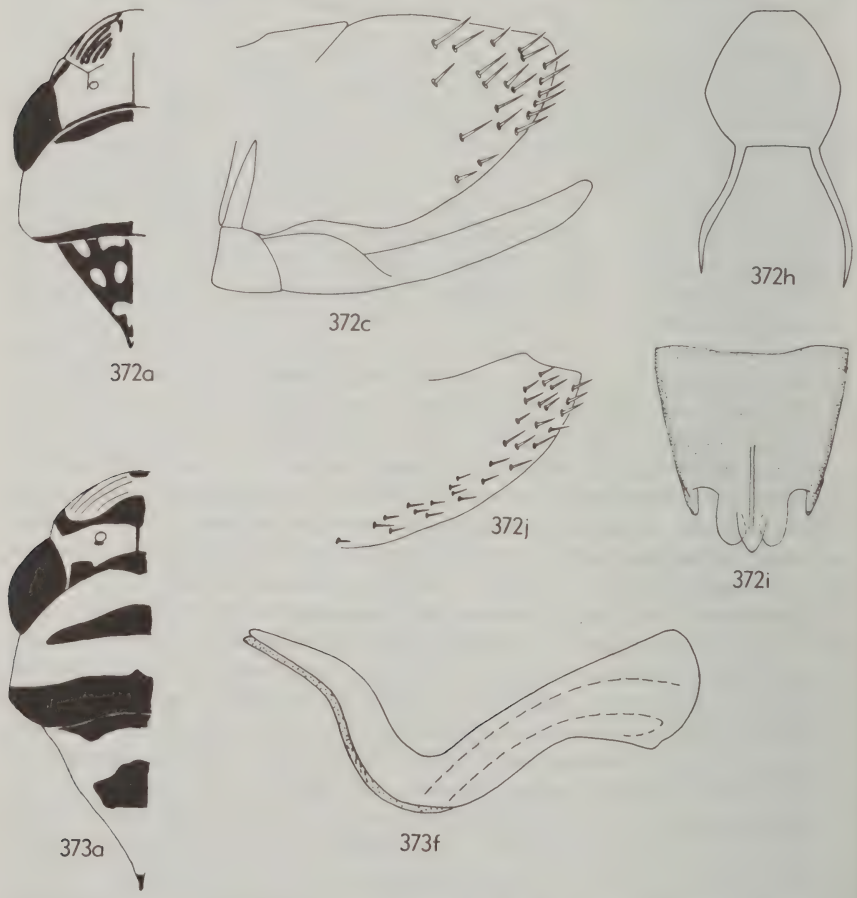
Vitaco, [Paraguay?]; one male, Río Vitale, Paraguay; one female, "H. Antonio"; two males, "Alto de las Cruces, W. Cordillera" (MMB). Melichar cited the last two of the above localities in Colombia, but this might possibly be Bolivia, or Venezuela.

J. mimula, n. sp., appears to be closely related to *J. pedisequula* (Jacobi), from which it differs markedly in the form of the female sternum VII, and in color pattern.

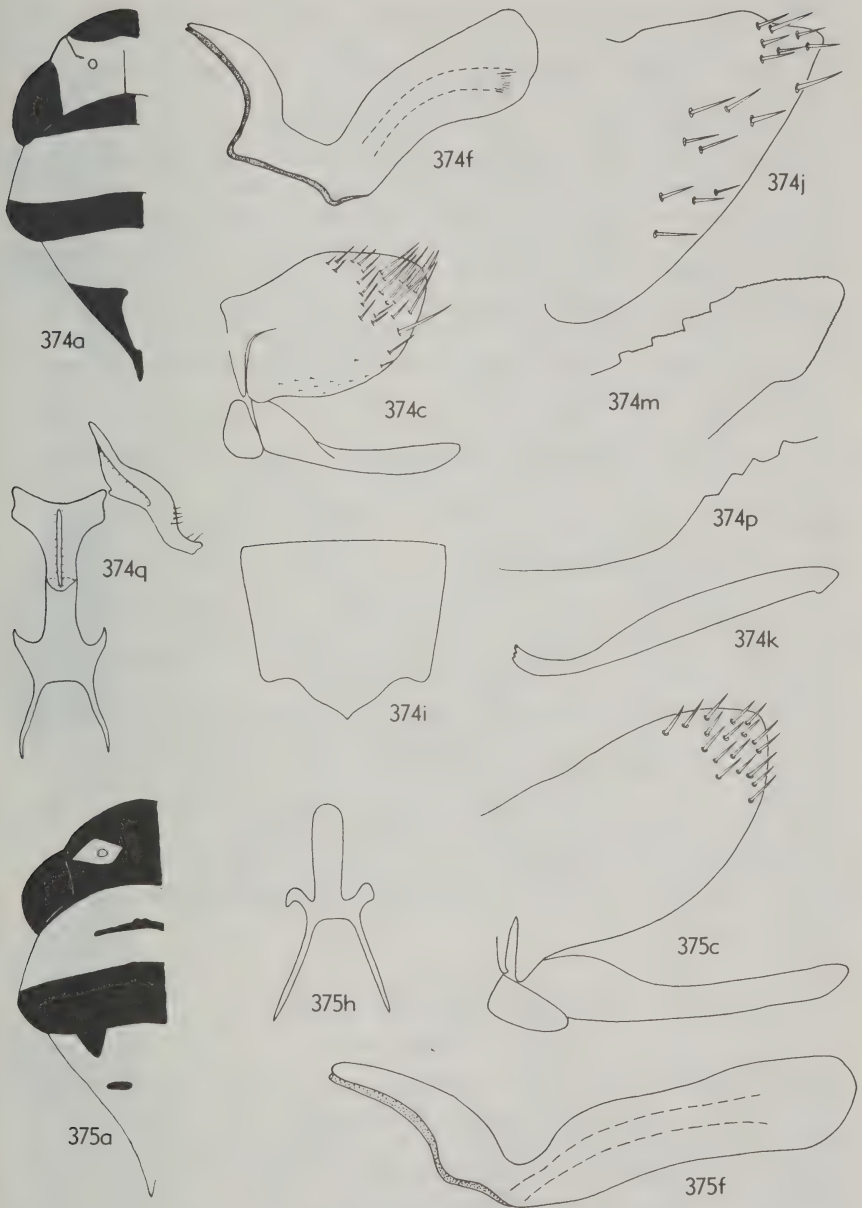
Juliaca clandestina, NEW SPECIES

FIGURE 375, PAGE 461

Length of male 7.1-7.8 mm. Head with median length of crown varying from slightly more than four-tenths to more than one-half interocular width,



FIGURES 372-373.—372, *Juliaca mimula*, n. sp. (*a*, *c*, *h*, from specimen from "Paraguay", *i*, *j*, from "Rio Vitaco"). 373, *J. tigrinula* (Osborn) (specimen from Yungas de Palmar, Bolivia).



FIGURES 374, 375.—374, *Juliaca pedisequula* (Jacobi) (*a, i,* from topotype; *c, f, q,* from specimen from Peru; remainder from "Sinchono", Peru): *p,* Dorsal margin of second valvula of ovipositor, basal teeth; *q,* style, connective, and paraphyses, from dorsal view. 375, *J. clandestina,* n. sp., holotype (*h* from caudoventral view).

and from one-fourth to one-third transocular width, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, crown without a transverse concavity, lateral clypeal sutures not attaining ocelli; antennal ledges in lateral view with anterior margins oblique and rectilinear; clypeus slightly flattened medially, muscle impressions moderately distinct; clypellus swollen slightly in basal half, but otherwise with its contour continuing contour of clypeus. Pronotal width greater than transocular width of head, disk not rugose, scutellum not transversely striate behind transverse sulcus, forewings coriaceous. Male plates extending posteriorly beyond pygofer apex, each with row of macrosetae extending to apex; aedeagus with shaft elongate for genus, longer than dorsal apodemes, slightly decurved, gradually broadened in apical half in lateral view, apex broadly and slightly convex. Paraphyses present, biramous. Female unknown.

Crown black with a yellow spot surrounding each ocellus, the two yellow spots often elongate transversely (holotype) and occasionally separated only by a narrow median black line; pronotum with anterior three-fifths dark yellow, usually (type) with a very narrow transverse arcuate black stripe near middle of yellow portion, posterior two-fifths black. Scutellum dark yellow, with a pair of angular markings near anterior margin, transverse sulcus partly black; forewings dull golden to bases of anteapical cells, veins, commissural and humeral margins, and costal margin, black; anteapical and apical cells dark fumose; a narrow submarginal orange stripe along costal margin; usually with apex of brachial cell (holotype) and disk of outer anteapical cell (holotype) paler yellow; face black with lateral portions of clypeus yellow and in some specimens (holotype) with additional yellow markings on lora and genae. Thoracic pleura yellow variously marked with black. Legs yellow.

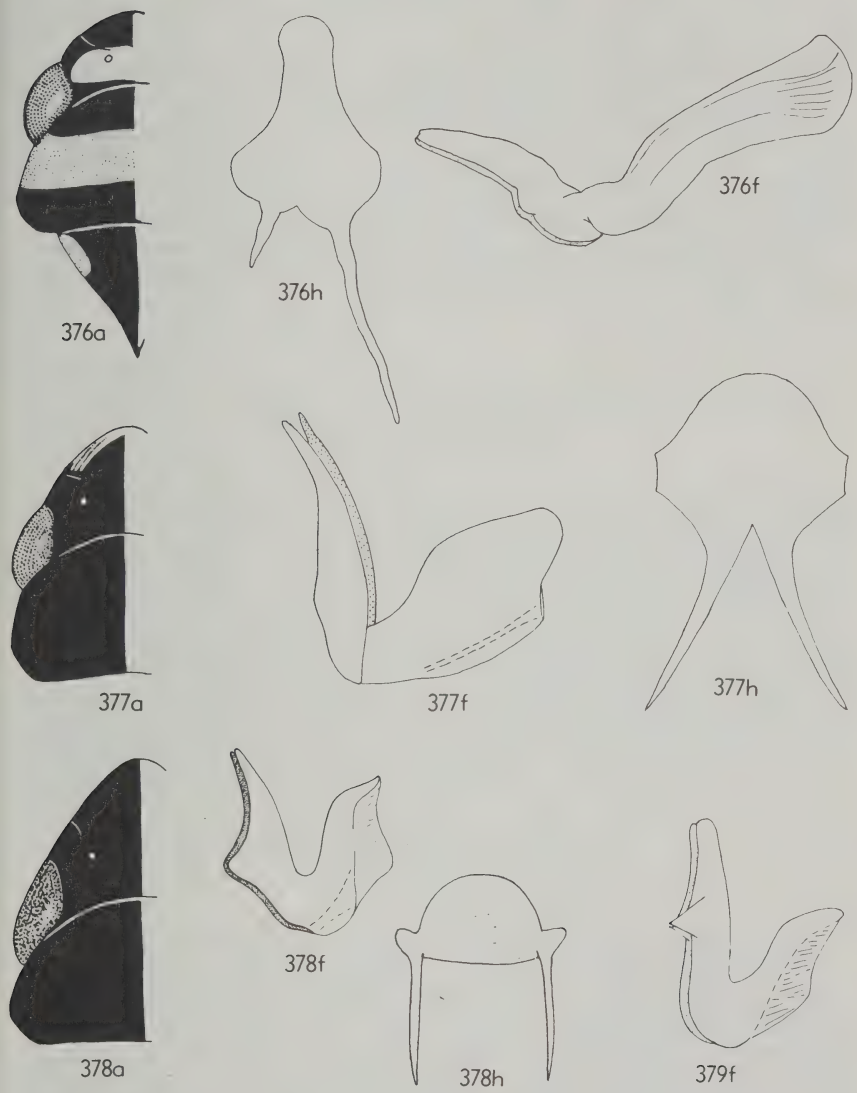
Holotype and twenty-one additional males, Yungas de Palmar, Bolivia, altitude 100 m., November, 1960 (A. Martínez) (SSM).

J. clandestina, n. sp., is closely related to *J. tigrinula* (Osborn), but the latter has the aedeagal shaft abruptly broadened, and the markings of the crown are distinct.

Juliaca pulla, NEW SPECIES

FIGURE 378, PAGE 463

Length of male 4.4 mm. Head with median length of crown more than eight-tenths interocular width, and one-half transocular width, anterior margin acutely subangular in dorsal view, ocelli located before a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown without a transverse concavity, lateral clypeal sutures attaining ocelli; antennal ledges in lateral view with anterior margins rectilinear and oblique; clypeus flattened, muscle impressions not very distinct, clypellus with profile continuing profile of clypeus. Pronotal width approximately equal to transocular width of head, disk rugose or not, scutellum transversely striate or not behind transverse sulcus, forewings translucent. Male plates extending posteriorly farther than pygofer apex, each with row of



FIGURES 376-379.—376, *Juliaca lepida* (Signoret) (specimen from Itaituba, Brazil; *h* from dorsal view, with shorter ramus abnormal). 377, *J. satelles* (Fowler) (*a, h,* from specimen from Costa Rica; *f* from Tabasco, Mexico; *h* from ventral view). 378, *J. pulla,* n. sp. (from specimen from Panama; *h* from dorsal view). 379, *J. melichari,* n. sp. (specimen from Rancho Grande, Venezuela).

macrosetae extending to apex; aedeagus with shaft very short, slightly decurved, approximately as long as dorsal apodemes, broader anteapically in apical half, obliquely concavely truncate apically; paraphyses biramous. Female unknown.

Crown, pronotum, and scutellum black, unmarked; forewing translucent brown or black, with anteapical transparent angular spot extending from costal margin into outer anteapical cell; face and thoracic pleura black, legs yellow.

Holotype male, El Valle, Panama, November, 1948 (N. L. H. Krauss) (USNM). One male, Potrerillos, Panama, May 11, 1935 (NCS).

J. pulla, n. sp., is closely related to *J. satelles* (Fowler) but is smaller, without the white saddle-spot on forewings, and without the pale pleura and face of *satelles*.

Juliaca melichari, NEW SPECIES

FIGURE 379, PAGE 463

Length of male 4.4-4.7 mm, of female 4.5-4.8 mm. Head with median length of crown varying from eight-tenths of to equal to interocular width and from slightly less than one-half to slightly less than six-tenths transocular width, anterior margin narrowly rounded in dorsal view, ocelli located before a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, other head characters as in *J. pulla*, n. sp. Pronotum with disk transversely rugose, other thoracic characters as in *pulla*. Male genitalia as in *pulla* but with shaft slightly more concave on ventral margin before apex, and with entire ventral portion membranous. Female abdominal sternum VII strongly produced medially and obtusangular.

Crown, pronotum, and scutellum black, unmarked; forewing translucent brown, darker near base, with a large spot bordering claval suture in base of clavus and a spot filling claval apex, yellow; with anteapical costal transparent spot as in *pulla*, but with a fleck of opaque yellow at its mesal extremity; face, pleura, and legs as in *pulla*.

Holotype male, Altos de Pipe, IVIC, Venezuela, July 2, 1968 (J. Maldonado C.); three females and one specimen without abdomen, Rancho Grande, Aragua, Venezuela, March 5, 1939 (C. H. Ballou) (USNM). One female, Rancho Grande, Venezuela, Aug. 22-31, 1967 (R. W. Poole), 1100 m.; nine males and nine females, same locality, March 28, 1946; one male and one female, same locality, April 24, 1946 (BZ). Three males, Tropical Research Station, N.Y. Zoological Society, same locality as preceding, March 7, 1946; one male, March 18, 1946; one female, April 13, 1945; one male, July 7, "1649"; and one female, June 27, 1946, all from same research station (AMNH).

J. melichari, n. sp., is very close to *pulla*, differing chiefly in the form of the aedeagus and in the markings of the forewings. This species is named in honor of Dr. Leopold Melichar.

Juliaca phalacra, NEW SPECIES

FIGURE 381, PAGE 466

Length of male 5.5-5.6 mm. Head with median length of crown from approximately six-tenths to three-fourths interocular width and from slightly more than one-third to more than four-tenths transocular width, anterior margin broadly rounded in dorsal view, ocelli located on a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, crown with a slight transverse concavity before ocelli; antennal ledges with anterior margins oblique and slightly convex; clypeus flattened, muscle impressions not very distinct, clypellus with profile continuing that of clypeus. Pronotal width greater than transocular width of head, disk rugose or not, scutellum transversely striate or not behind transverse sulcus, forewings opaque basally, translucent in apical third. Male plates not extending posteriorly as far as pygofer apex, each with row of macrosetae extending to apex; aedeagus with shaft curved gradually and slightly ventrally, longer than dorsal apodemes, slightly broadened and smoothly rounded at apex; paraphyses biramous. Female unknown.

Color black, crown with a pale spot at apex and a narrow ivory line bordering anterior portion of inner eye margin on each side; forewing with a bright yellow spot in corium opposite apical third of clavus, a smaller hyaline to dull yellow spot before base of second apical cell and in some specimens with a smaller round pale spot before base of outer apical cell; face and thoracic pleura black; legs black basally, yellow more apically.

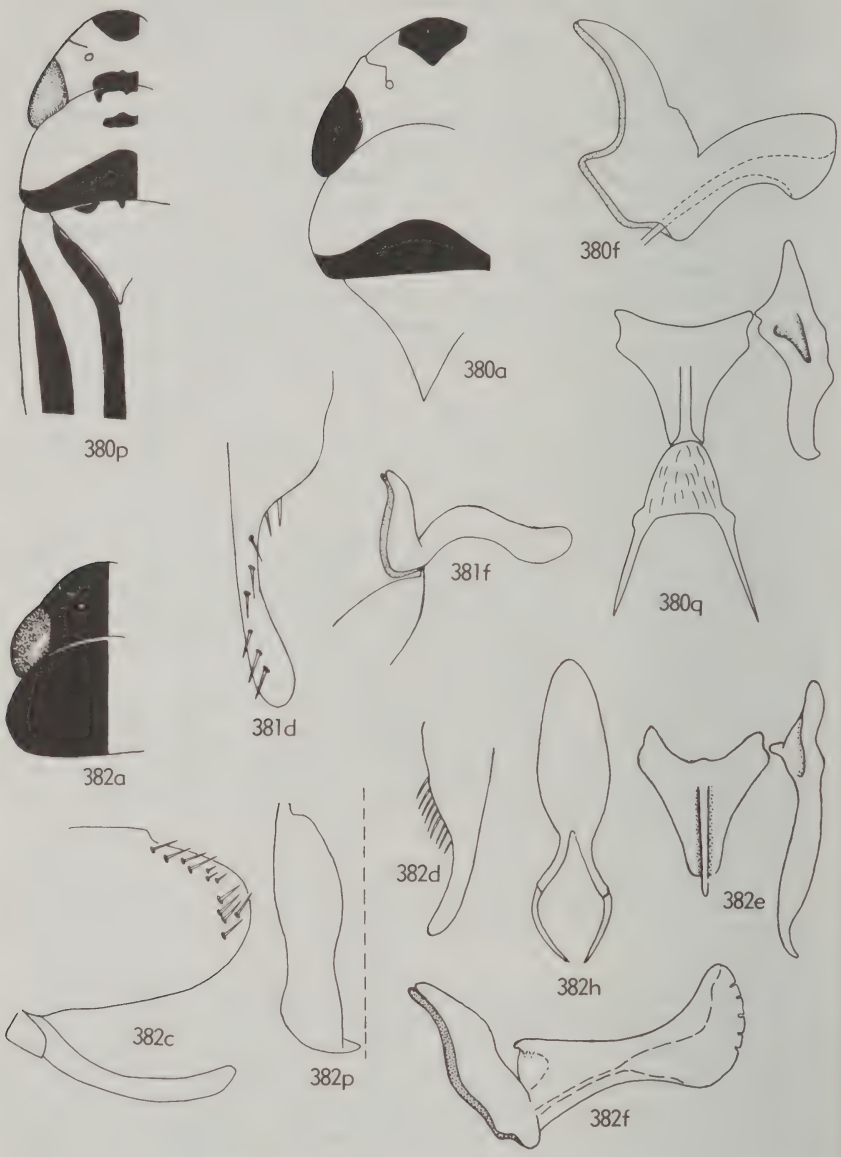
Holotype and three additional males, Colombia, March 15, 1912 and one male, same data except March 11, 1912, Cornell University collection.

J. phalacra, n. sp., is related to *J. naevula* (Melichar) but differs in the form of the aedeagus, in the presence of pale markings on the head and in lacking a saddle-spot on the forewings.

Juliaca deanna, NEW SPECIES

FIGURE 382, PAGE 466

Length of male 5.1 mm, of female 4.9 mm. Head with median length of crown from seven-tenths to three-fourths interocular width and four-tenths or slightly less than four-tenths transocular width, anterior margin broadly rounded in dorsal view, ocelli located behind a line between anterior eye angles, crown without a transverse concavity, lateral clypeal sutures not attaining ocelli; antennal ledges in lateral view with anterior margins rectilinear and almost vertical; clypeus convex, muscle impressions not very distinct, clypellus with profile continuing profile of clypeus. Pronotal width approximately equal to transocular width of head, disk and posterior portion of scutellum obscurely transversely rugulose, forewings opaque. Male plates not extending as far posteriorly as pygofer apex, each with macrosetae occurring in a row near midlength, aedeagus with shaft of moderate length for the genus, narrowest at midlength in lateral view, broadest apically and with



FIGURES 380-382.—380, *Juliaca homalina* (Melichar) (*p* from holotype; remainder from specimen from La Sombra, Dept. Putumayo, Peru): *p*, Anterior dorsum and portion of forewing; *q*, style, connective, and paraphyses, from dorsal view. 381, *J. phalacra*, n. sp., holotype (*bulbus ejaculatorius* shown in *f*). 382, *J. deanna*, n. sp., holotype (*h* from ventral view): *p*, Male pygofer, right side, from caudoventral view.

apical margin convex; pygofer with a short dorsoapical toothlike process; paraphyses present and biramous. Female abdominal sternum VII much as in *J. aureocincta,* n. sp. (fig. 367*i*); other female characters as in *aureocincta* except that no setae on pygofer arise near middle of disk.

Dorsum, including forewings at rest, black, with a large suboval transcommissural yellow spot occupying most of clavus of each wing, male with an additional anteapical small circular spot near costal margin, female with the spot larger, arcuate, and extending forward to midlength of costal margin; face black with a narrow pale marginal area on genae; thoracic pleura black; legs yellow.

Holotype male and one female, Baños, Ecuador, May 6, 1939 (W. Clark-Macintyre), 2500 meters (NCS). One male, 6-12 miles southwest of Baños, Ecuador, north slope of Mt. Tungurahua, February 18, 1955 (E. I. Schlinger and E. S. Ross), 2500-3000 m. (CAS). Holotype on indefinite loan to USNM.

J. deanna, n. sp., is very similar in markings to *J. naevula* (Melichar), but the transcommissural claval spot extends onto the corium in each wing in *naevula.* In the male genitalia of *naevula,* the pygofer is longer relative to its width than in *deanna,* and the aedeagus is not broadened apically in lateral view.

Juliaca huasima, NEW SPECIES

FIGURE 383, PAGE 469

Length of male 4.9 mm, of female 5.1-5.3 mm. Head with median length of crown varying from slightly less than seven-tenths of to almost three-fourths interocular width, and from slightly more than four-tenths to almost one-half transocular width, anterior margin narrowly rounded in dorsal view, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line, without a distinct transverse concavity, lateral clypeal sutures not attaining ocelli; antennal ledges in lateral view with anterior margins rectilinear and vertical; clypeus convex, muscle impressions distinct or not, clypellus with profile continuing profile of clypeus. Pronotal width equal to or greater than transocular width of head, disk very weakly rugose near middle, scutellum weakly transversely striate behind transverse sulcus, forewing translucent. Male plates extending farther posteriorly than pygofer apex, each with row of macrosetae extending to apex; aedeagus with shaft not elongate for the genus, slightly decurved, much shorter than elongate dorsal apodemes, of nearly uniform width throughout length, obliquely truncate apically; paraphyses present and biramous. Female abdominal sternum VII not keeled, posterior margin slightly produced, slightly angular at apex; second valvulae acute apically; pygofer angulate dorsoapically, with a number of irregularly arranged macrosetae in a diagonal group parallel to posteroventral pygofer margin.

Crown black in apical half, basal half paler, varying from entirely olive green except a very narrow transverse black marking near middle of basal margin, to black transversely banded with ivory, the width of the band variable; pronotum with a transverse basal black band covering one-third to one-half of pronotal surface, remainder olive green; forewing very variable,

clavus varying from almost entirely olive green to black with a longitudinal olive green stripe bordering commissural margin; corium black, in some specimens unmarked, in others bearing a pale stripe bordering claval suture, and in some with a green semi-elliptical vitta extending from claval margin near midlength to claval apex, thence to costal margin at apex of outer apical cell; face black, antennal ledges and in some specimens a narrow lower marginal area pale; posterior portion of proepimeron pale, remainder of thoracic pleura black; legs yellow.

Holotype male and one female, Chanchamayo, Peru, July 21, 1960 (J. Salazar); three female topotypes, June 22, 1960 (J. Salazar); two female topotypes, June 25, 1960 (one Salazar and Ramirez; one Young and Salazar); one male, Tingo María, Peru, August 15, 1960 (O. Vargas) (NCS). Three males, Monsón Valley, Tingo María, Peru, October 17 (2) and 21 (1), 1954 (E. I. Schlinger and E. S. Ross) (CAS). Holotype on indefinite loan to USNM.

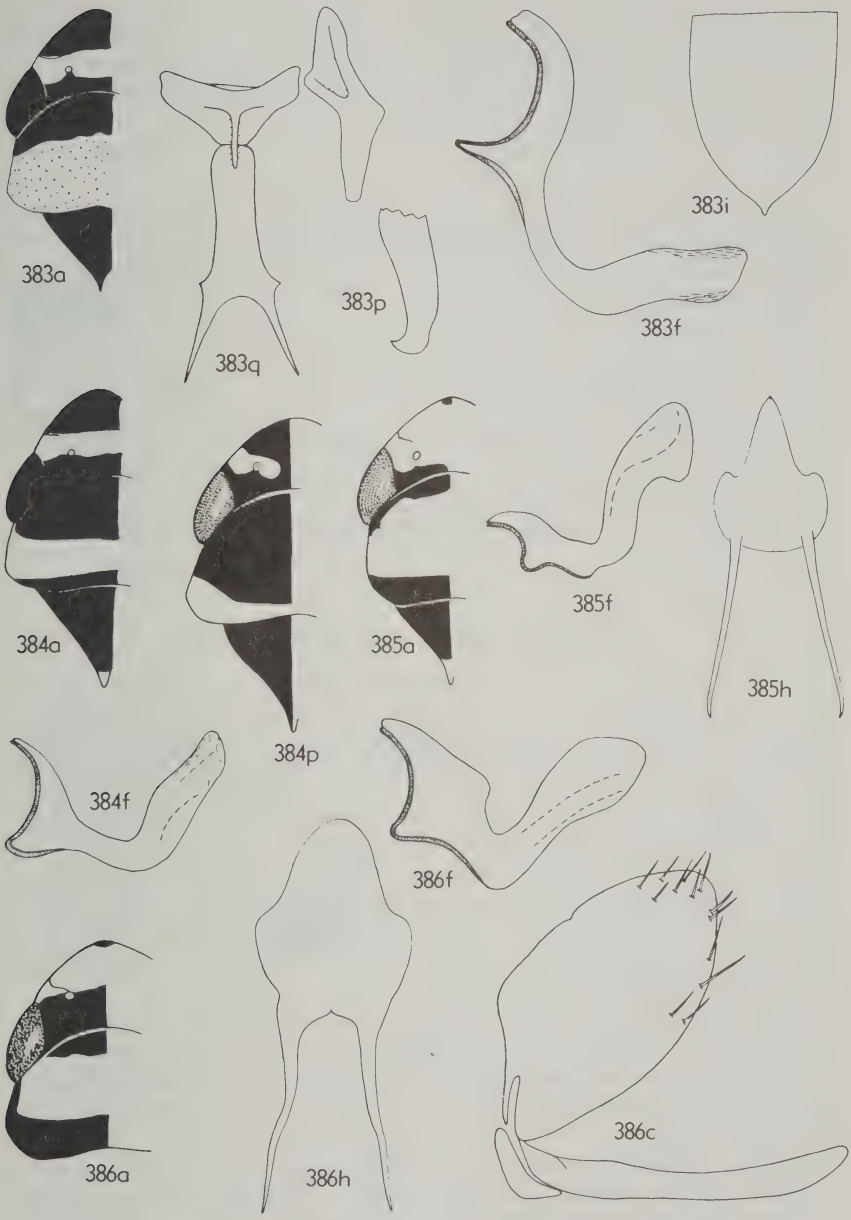
J. huasima, n. sp., is closely related to *J. sertigerula* (Jacobi) from which it differs in the longer basal apodemes of the aedeagus, as well as in the characters used in the key.

Juliaca chapini, NEW SPECIES

FIGURE 385, PAGE 469

Length of male 5.6-6.4 mm, of female 6.1-6.8 mm. Head with median length of crown varying from three-fourths to more than eight-tenths interocular width and from slightly less than one-half to one-half transocular width, anterior margin sharply rounded in dorsal view, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown with a transverse concavity before ocelli, lateral clypeal sutures attaining ocelli; antennal ledges in lateral view with anterior margins rectilinear and slightly oblique; clypeus convex, muscle impressions distinct or not, clypellus with profile continuing profile of clypeus. Pronotal width less than transocular width of head, disk not or very weakly transversely rugose, scutellum not transversely striate behind transverse sulcus, forewings varying from translucent to opaque. Male plates extending posteriorly slightly farther than pygofer apex, each with a few macrosetae in a short row near midlength of plate; aedeagus with shaft short, decurved, longer than dorsal apodemes, broader in apical half, obliquely truncate apically; paraphyses present and biramous. Female abdominal sternum VII with posterior margin slightly produced and angulate at apex; second valvulae acute apically, but less so than in *J. scalarum*, n. sp. (fig. 387*m*), pygofer setae much as in *scalarum*.

Crown and pronotum pale yellow with a small spot at apex of crown, a narrow transverse interocular band at its base continuous with a narrow transverse band at anterior pronotal margin, and a narrow band on posterior pronotal margin, dark brown to black; scutellum and forewings dark brown, with a broad transverse yellow transcommissural band in basal half of clavus



FIGURES 383-386.—383, *Juliaca huasima,* n. sp. (*i* from topotype; remainder from holotype): *p,* Style apex from lateral view; *q,* style, connective, and paraphyses, from dorsal view. 384, *J. sertigerula* (Jacobi) (*a* from lectotype; remainder from specimen from Chanchamayo, Peru): *p,* Anterior dorsum. 385, *J. chapini,* n. sp., holotype. 386, *J. vargasi,* n. sp., holotype.

and including scutellar apex, truncate on each wing at claval suture, and a second similar band at claval apex, but crossing claval suture and attaining costal margin or not, with a smaller round yellow spot including outer anteapical cell and base of outer apical cell, with or without a yellow stripe parallel to costal margin in middle portion of length of latter; face, thoracic pleura, and legs, pale yellow, except for a black marking below lateral pronotal carina in some specimens.

Holotype male and one female, Guasca-Gacheta, Puente Licio, Cundinamarca, Colombia, February 20, 1942 (Chapin No. 658); one male, Ouro Preto, Brazil, April 1954 (N. L. H. Krauss) (USNM). One female, 3 mi. west of Villavicencio, Meta, Colombia, 920 m., March 11, 1935 (E. I. Schlinger and E. S. Ross) (CAS). One male, Bogotá, Colombia (L. Richter); one female, Colombia (L. Richter) (NCS). One female, Rio de Janeiro (MMB).

This species is named in honor of the late Dr. E. A. Chapin, a respected colleague and a good friend. *J. chapini*, n. sp., is closely related to *scalarum* and *vargasi*, n. sp. (below). It is easily distinguished from *scalarum* by the longer male plates and by the form of the female abdominal sternum VII which has no small protuberance on each side of middle of the posterior margin. The ventral margin of the aedeagus is more strongly concave in *chapini* than in *vargasi*.

Juliaca vargasi, NEW SPECIES

FIGURE 386, PAGE 469

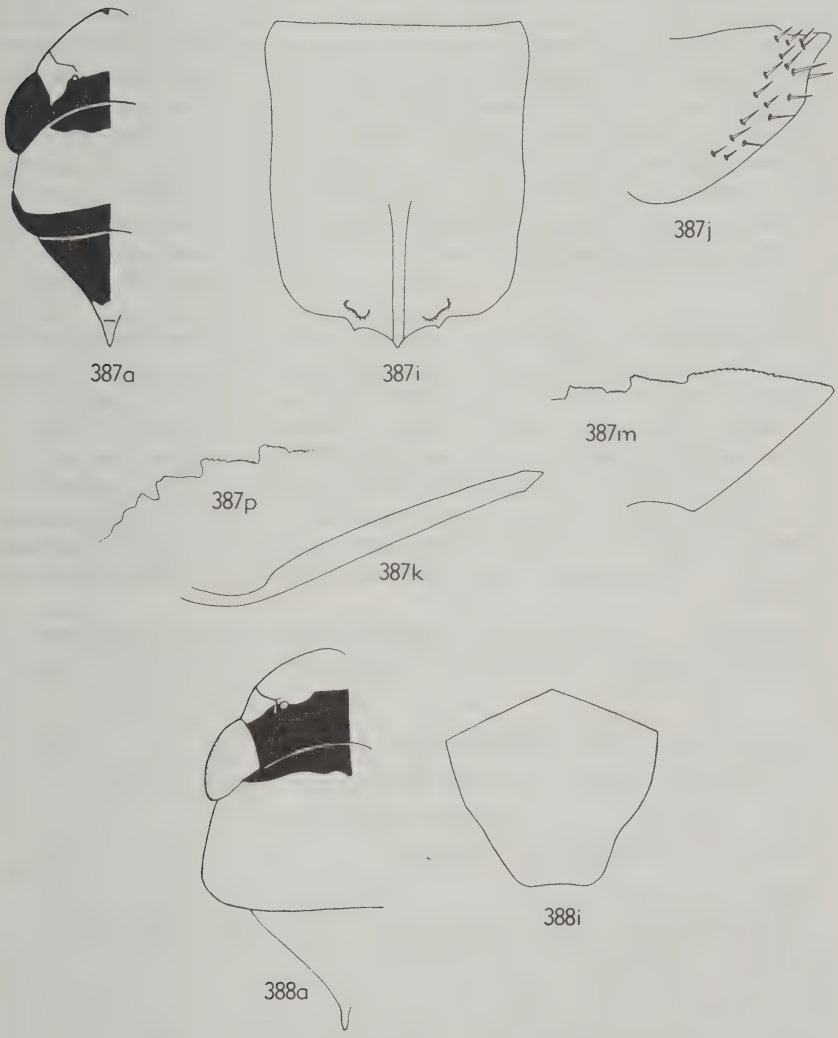
Length of male 6.0-6.1 mm, of female 6.4-6.7 mm. Head with median length of crown approximately three-fourths interocular width and slightly less than one-half transocular width, ocelli located slightly behind a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, other head characters as in *J. chapini*, n. sp. (above). Thorax as in *chapini* except that posterior portion of scutellum is weakly transversely striate in one specimen. Male genitalia as in *chapini*, except that setae are not as extensive on pygofer and more restricted to marginal area, and except that aedeagal shaft is much less strongly concave on its ventral margin in lateral view.

Color of dorsum as in *chapini*, but with transverse band at claval apex shorter, not attaining costal margin in any of specimens at hand, and without anteapical yellow spot, without a pale stripe parallel to costal margin; thoracic pleura partly black, mesosternum black, face, remainder of thorax, and legs, yellow.

Holotype male and one female, El Junquito, Venezuela "Km. 17", March 17, 1939 (C. H. Ballou); one male and one female, Rancho Grande, Venezuela, January 13 and January 19, 1966; one female, 15 km. southwest of Barinitas, Venezuela, February 25, 1969 (Duckworth and Dietz) (USNM). One male, Tingo María, Peru, August 12, 1960 (O. Vargas); one male, same locality, August 15, 1960 (D. Young) (NCS). One male, 10 mi. southwest of Las Palmas, Huánuco, Peru, 1000 m., November 17, 1954 (E. I. Schlinger and E. S. Ross) (CAS). One specimen, Coroico, Bolivia (OSU).

This species is named in honor of Oswaldo Vargas, who helped greatly during my collecting efforts in the mountainous portion of Peru.

In addition to distinctive characters in the description above, similarities to other species are discussed in the description (above) of *chapini*.



FIGURES 387, 388.—387, *Juliaca scalarum*, n. sp. (*a* from Sasaima, Colombia; remainder from Colombia): *p*, Teeth at base of dorsal margin of second valvula of ovipositor. 388, *J. collata* (Fowler), lectotype.

Juliaca scalarum, NEW SPECIES

FIGURE 387, PAGE 471

Length of male 6.4-6.5 mm, of female 6.9-7.1 mm. Head with median length of crown varying from slightly more than six-tenths to three-fourths interocular width and slightly more than four-tenths transocular width, anterior margin sharply rounded in dorsal view, ocelli located slightly behind a line between anterior eye angles, each slightly nearer adjacent anterior eye angle than to median line of crown; clypeus very slightly flattened medially, muscle impressions not very distinct; other head characters as in *J. chapini*, n. sp. (above). Thoracic characters as in *chapini*. Male plates more abruptly narrowed in basal halves than in *chapini* or *vargasi*, n. sp., not extending nearly as far posteriorly as pygofer apex, other male genital characters as in *chapini*. Female abdominal sternum VII with posterior margin weakly, obtusely produced medially, with a submarginal tumescence on each side of produced portion; second valvulae acute apically, pygofer with posterodorsal apex acute, with a number of setae in a diagonal group parallel to posteroventral margin.

Color of dorsum as in *chapini* but forewings without a yellow stripe parallel to costal margin and without anteapical yellow spot; face, legs, and thoracic pleura as in *chapini* except that mesepisternum has a large black spot.

Holotype male, one additional male, two females, and one specimen without abdomen, Sasaima Cundinamarca, Colombia, 1500 m., January 4, 1961 (M. Revelo) on "Matorral" [bushes]; six males and 13 females, also from Sasaima, December 13, 1960 (M. Revelo), on tea (RFC). Two females, Colombia, 1942 (L. Richter) (NCS). One male, "Alto Palmar", Chapare Prov., Dept. of Cochabamba, Peru, 2500 ft. (R. Cumming) (OSU). Holotype in USNM.

J. scalarum, n. sp., is very close to *vargasi* and *chapini*, above, in the treatment of which distinguishing characters are discussed.

65. SUBRASACA, NEW GENUS

(*S. flavoornata* (Stål) was not included in study of external characters)

FIGURES 389-396

Type-species: *Tettigonia ignicolor* Signoret.

Length 5.5-6.7 mm.

Head moderately produced, median length of crown from slightly less than one-half to three-fourths interocular width and from one-third to almost one-half transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly before a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with or without a transverse concavity before ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior

margins varying intraspecifically from oblique and slightly convex to almost vertical and rectilinear; clypeus convex medially, muscle impressions distinct or not, transclypeal suture obsolete medially, clypellus with profile continuing contour of clypeus.

Thorax with pronotal width equal to or greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin varying from slightly concave to rectilinear, disk with or without weak rugae; scutellum transversely rugose or not behind transverse sulcus. Forewing without a distinct membrane, with three closed anteapical cells of which the bases are proximal or distal (*S. flavolineata* (Signoret)) to claval apex and four apical cells of which base of fourth is more proximal than base of third (venation obscure in *flavolineata*), without an anteapical plexus of veins, texture varying from translucent to coriaceous *(flavolineata)*; forewings of female in repose exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer not strongly produced, posterior margin varying from broadly convex to subtruncate, with macrosetae varying from sparse to dense, on posterior half, without processes. Plates fused basally, triangular, tapering gradually, not extending posteriorly as far as pygofer apex, with uniseriate macrosetae. Style extending posteriorly as far as or farther than apex of connective, preapical lobe distinct, apex varying from truncate to narrowly rounded at apex. Connective narrowly Y-shaped. Paraphyses present, very short-stalked, with two or four rami arising near base (exception: *S. monacha* (Melichar)). Aedeagus very short (exception: *S. flavoornata* (Stål)), very broad in lateral view (exception: *monacha*), with or without a pair of dorsoapical processes.

Female abdominal sternum VII with posterior margin convex or shallowly concave. Ovipositor with second valvula convex on dorsal margin and bearing teeth throughout portion beyond basal curvature, the primaries bearing secondary denticles, ventral margin rectilinear (*S. flavolineata* (Signoret)) or slightly concave (*S. ignicolor* (Signoret)), apex of second valvula and pygofer as in illustration of *Juliaca pedisequula* (Jacobi) (fig. 374) (this description of ovipositor and pygofer based on a study of *ignicolor* and *flavolineata*).

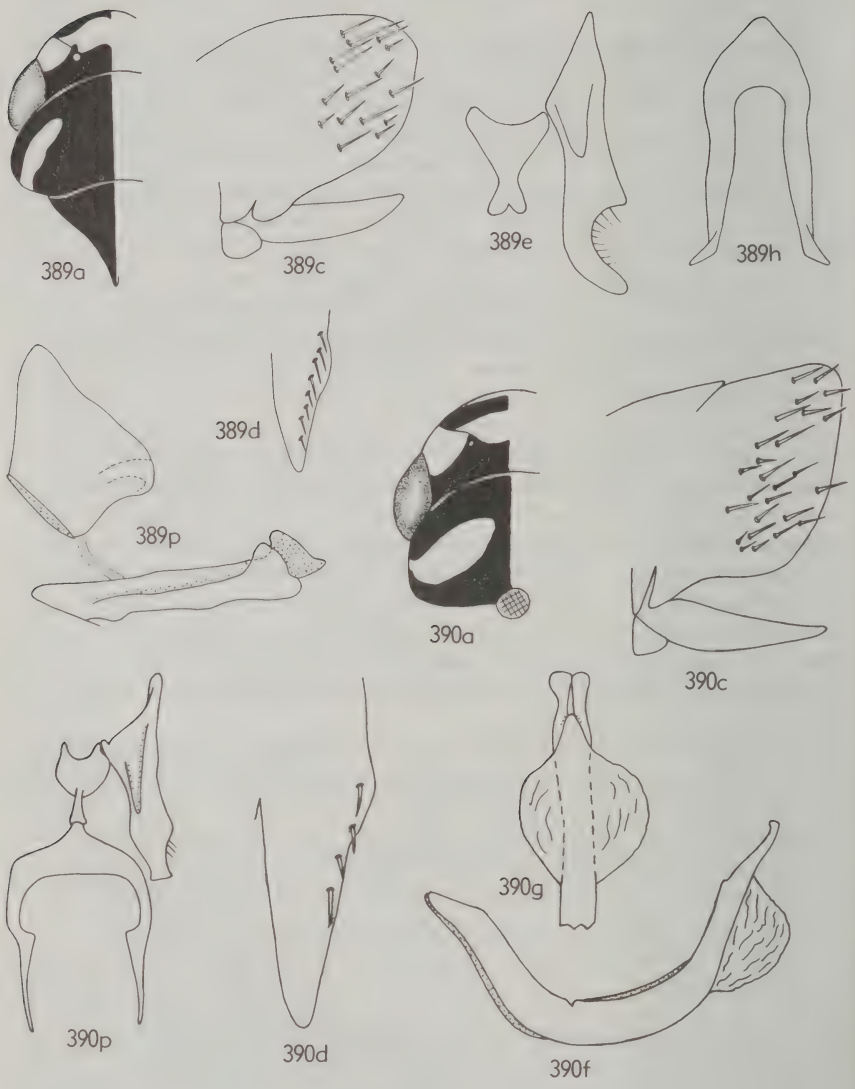
Species of *Subrasaca* vary from somber gray to bright green with red, yellow, or black markings.

Subrasaca, new genus, occurs only in southern Brazil and Argentina. It is related to *Juliaca* Melichar from which it may be distinguished by the shorter, broader aedeagus, and the preapical lobe of the style in the males, and by the (usually) concave posterior margin of abdominal sternum VII in the females.

My identification of *Tettigonia flavolineata* Signoret and of *T. curvovittata* Stål are based on a study of the female lectotypes of these nominal species.

I have studied only the lectotype of *Tettigonia flavoornata* Stål (fig. 390). It was not at hand when the above generic description was written.

The present interpretation of *Tettigonia ignicolor* Signoret is based on the original illustration. The only specimen I found in the Signoret collection in



FIGURES 389, 390.—389, *Subrasaca ignicolor* (Signoret) (from specimen from Minas Gerais, Brazil; *h* from ventral view): *p*, Aedeagus and paraphyses, from lateral view. 390, *S. flavoornata* (Stål), lectotype (only apical portion of aedeagus shown in *g*): *p*, Style, connective, and paraphyses, from dorsal view.

Vienna was without an abdomen, had one forewing and the apex of the remaining one missing, and was badly molded. But the crown and pronotum agreed with the original illustration. There was only a single badly damaged specimen of *Cardioscarta occulta* Melichar in the Moravian Museum at Brno. I placed a lectotype label on a male in the museum in Brussels. It bore the labels "9.72/Rio Janeiro" and "M. R. Belg." and "Coll. Camille/Van Volxem." and "Tettigonia sp./det. L. Lethierry" and "Cardiosc. occulta/M./Rev. L. Melichar 1922". The specimen agreed only moderately well with the original description, but is probably what Melichar had in hand.

I have seen only two males of *Microgoniella monacha* Melichar. In the one I dissected, the paraphysis may be abnormal (fig. 391*h*). Originally this species was reported from Colombia. One of the two specimens bore the label: Río Aguatal; the other: Río Vitaco. Both are labeled "Paraguai". I have not been able to find these rivers in available gazeteers. The form of the aedeagus varies markedly from other species. Perhaps the generic assignment will be changed when more specimens are studied.

My interpretation of *Tettigonia nigriventris* Signoret is based on illustrations of the female lectotype and subsequent association of males with those illustrations and with the original illustration of Signoret.

I have not seen type material of *Tettigonia rhienetta* Signoret. The present interpretation is based on a male in MMB from São Paulo which agrees with Signoret's original illustration.

SPECIES OF *SUBRASACA*

atronasa, n. sp. S. Brazil.
austera, n. sp. S. Brazil.
flavolineata (Signoret), 1855d:791 (*Tettigonia*). S. Brazil. New combination.
    curvovittata (Stål), 1862e:43 (*Tettigonia*). New synonymy.
flavoornata (Stål), 1862e:41 (*Tettigonia*). S. Brazil. New combination.
ignicolor (Signoret), 1854a:8 (*Tettigonia*). S. Brazil. New combination.
    occulta (Melichar), 1932a:300 (*Cardioscarta*). S. Brazil, Argentina. New synonymy.
monacha (Melichar), 1951a:99 (*Microgoniella*). Paraguay (?). New combination.
nigriventris (Signoret), 1855d:784 (*Tettigonia*). Brazil. New combination.
rhienetta (Signoret), 1854b:352 (*Tettigonia*). S. Brazil, Argentina. New combination.

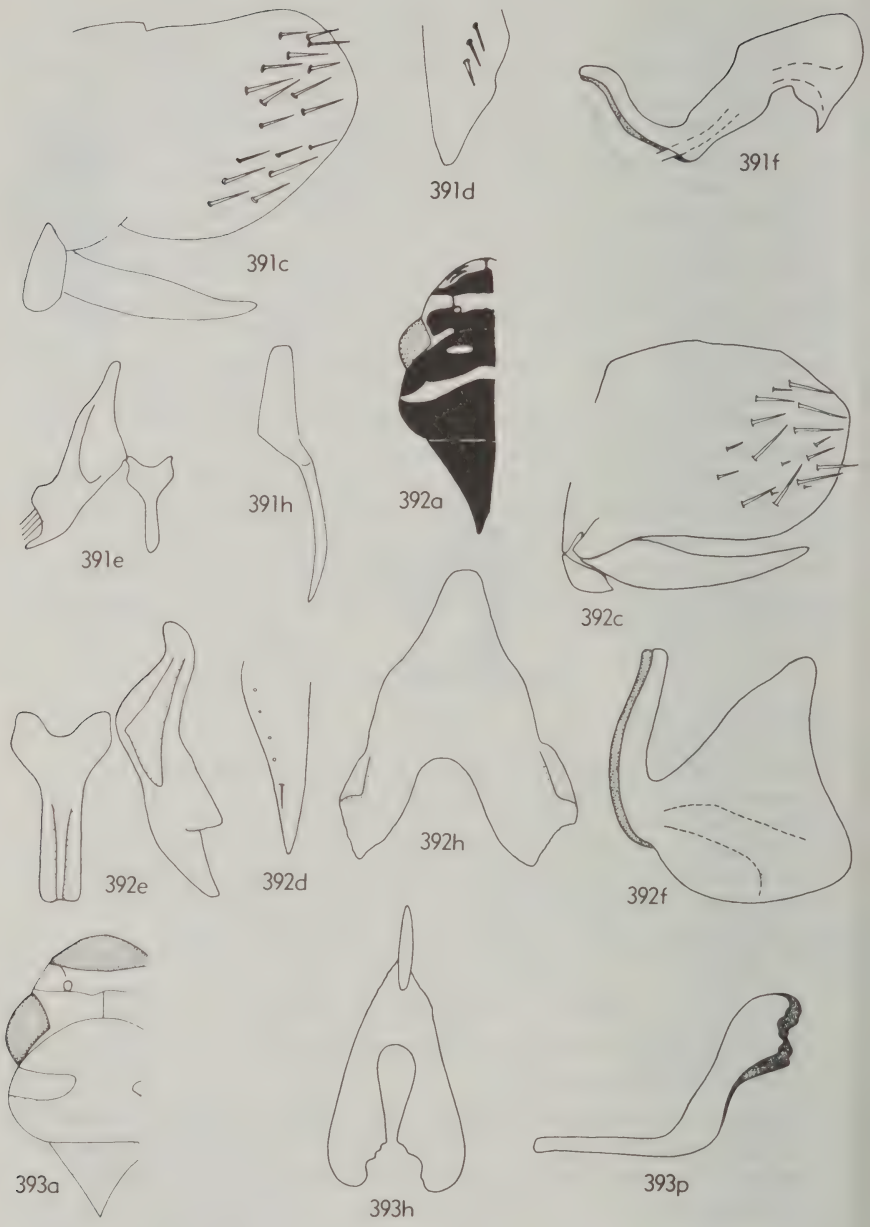
KEY TO MALES OF *SUBRASACA*

1. Crown and pronotum black with orange markings 2
   Crown and pronotum not so 3

2. Aedeagus and its basal apodomes very short (fig. 389*p*); styles not truncate apically ..... *ignicolor* (Signoret) (fig. 389)
   Aedeagus and its basal apodomes much longer (fig. 390*f*); styles truncate apically ..... *flavoornata* (Stål) (fig. 390)

3. Paraphyses unbranched ..... *monacha* (Melichar) (fig. 391)
   Paraphyses with two or more rami 4

4. Paraphyses with two rami 5
   Paraphyses with four rami 7



FIGURES 391-393.—391, *Subrasaca monacha* (Melichar) (from specimen from Río Aguatal, "Paraguai"; *h* from dorsal view). 392. *S. austera*, n. sp., holotype (*h* from caudoventral view). 393, *S. atronasa*, n. sp., holotype (*h* from ventral view): *p*, Paraphyses from lateral view.

5. Apex of head dark ..... *atronasa*, n. sp.
   Apex of head pale 6

6. Paraphyses with rami very broad (fig. 392*h*) ..... *austera*, n. sp.
   Paraphyses with rami much narrower (fig. 394*h*)
   rhienetta (Signoret) (fig. 394)

7. Paraphyses with all rami arising at base
   flavolineata (Signoret) (fig. 395)
   Paraphyses with two longer rami branched near their midlength
   nigriventris (Signoret) (fig. 396)

Subrasaca austera, NEW SPECIES

FIGURE 392, PAGE 476

Length of male 6.0 mm. Head with median length of crown approximately seven-tenths interocular width and more than four-tenths transocular width, crown with a transverse concavity before ocelli; pronotum without rugae; scutellum transversely rugulose behind transverse sulcus; forewing with bases of anteapical cells proximal to claval apex, texture translucent. Male pygofer with posterior margin broadly shallowly convex, macrosetae sparse; style extending posteriorly approximately as far as apex of connective; connective with median portion much longer than arms; paraphyses V-shaped with arms very broad, aedeagus subtriangular in lateral view, without processes. Female unknown.

Ground color of crown, pronotum, and scutellum black, crown with a transverse band at midlength, anterolateral margins broadly except muscle impressions, and a line bordering each inner eye margin and extending mesally a short distance along posterior margin of head, pale; pronotum with a narrow transverse arcuate line at midlength and a more anterior oval spot on each side, yellow; forewing translucent brown, claval suture bordered mesally with an ivory stripe that is interrupted basally, thence continued to humeral margin of pronotum; face yellow with a median percurrent clypeal stripe, muscle impressions, clypellus, most of lora and adjacent portions of genae dark brown to black; legs stramineous.

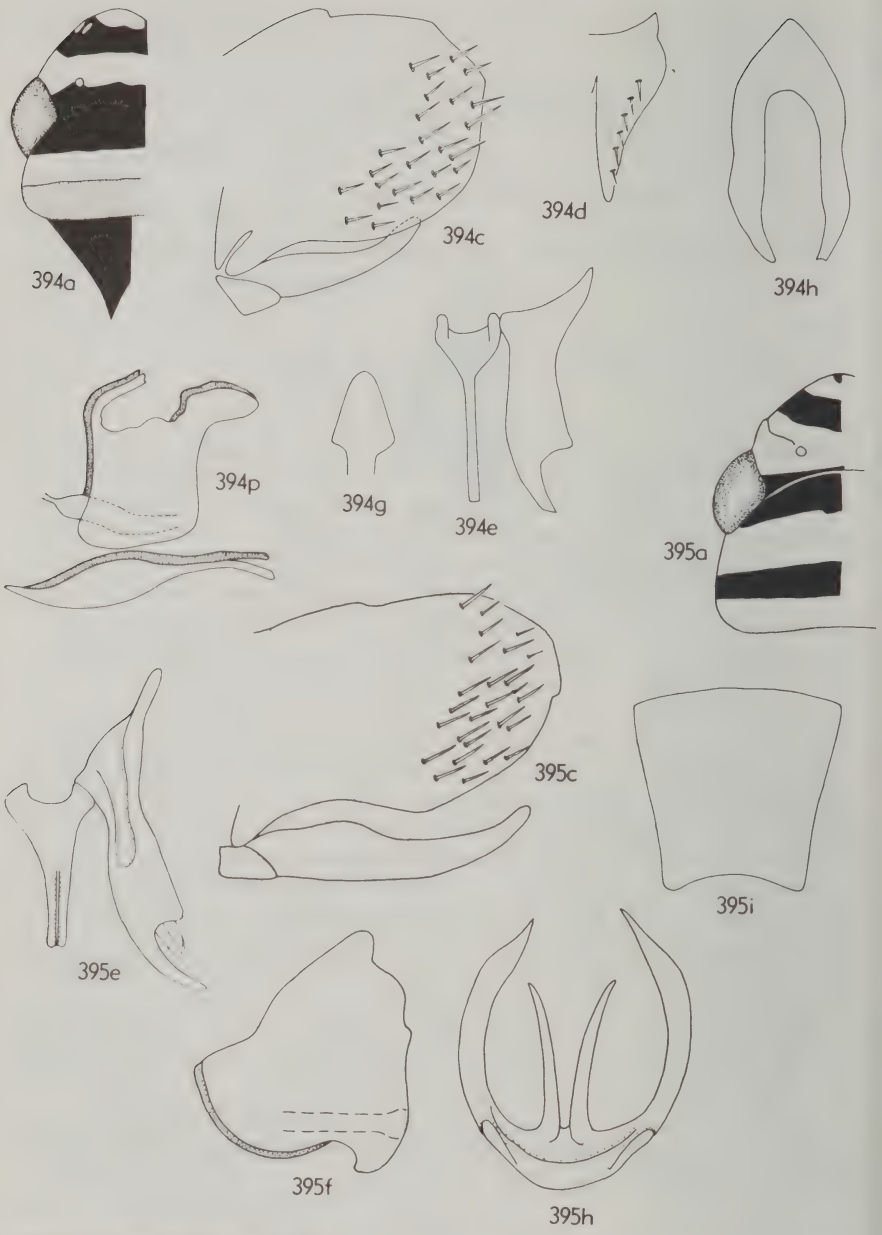
Holotype male, Nova Teutonia, Santa Catharina, Brazil, September 25, 1952 (F. Plaumann) and one additional male, same data except date, October 15, 1952 (NCS). Holotype on indefinite loan to USNM.

S. austera, n. sp., is very similar to *S. rhienetta* (Signoret), from which it may be separated readily by the broader rami of the paraphyses and the different form of the aedeagus (fig. 392*f*) in *austera*.

Subrasaca atronasa, NEW SPECIES

FIGURE 393, PAGE 476

Length of male 5.6 mm, of female 6.3 mm. Head with median length of crown slightly greater than three-fourths interocular width and slightly less



FIGURES 394, 395.—394, *Subrasaca rhienetta* (Signoret) (from specimen from São Paulo, Brazil; *h* from ventral view; only aedeagal apex shown in *g*): *p*, Aedeagus and paraphyses, from lateral view. 395, *S. flavolineata* (Signoret) (*a*, *i*, from lectotype; remainder from specimen from Petropolis, Brazil; *h* from caudoventral view).

than one-half transocular width, crown with a slight transverse concavity before ocelli; pronotum and scutellum without rugae; forewing with bases of anteapical cells opposite claval apex, texture translucent. Male genitalia as in *S. austera,* n. sp., except that the rami of the paraphyses are narrower and less divergent.

Ground color of dorsum pale brown (darker brown on crown and pronotum in holotype), a transcoronal stripe through the ocelli, a transpronotal stripe that is interrupted in some specimens (holotype), a diagonal stripe in base of clavus and a narrow transverse stripe narrowly interrupted at commissural margin at claval apex, pale yellow to bluish-ivory; face with a dark spot at base of clypeus, remainder of face, thoracic pleura, and legs, pale yellow, unmarked except in holotype which is suffused with brown beneath dorsopleural carinae.

Holotype male and three additional males, Nova Teutonia, Brazil (F. Plaumann). The holotype is without a collecting date, two of the other specimens were collected August 1, 1939 (NCS). Holotype on indefinite loan to USNM.

S. atronasa is very close to *S. austera,* n. sp., from which it can be separated by the dark apex of the head, by the pronotal stripe, and by the form of the paraphyses.

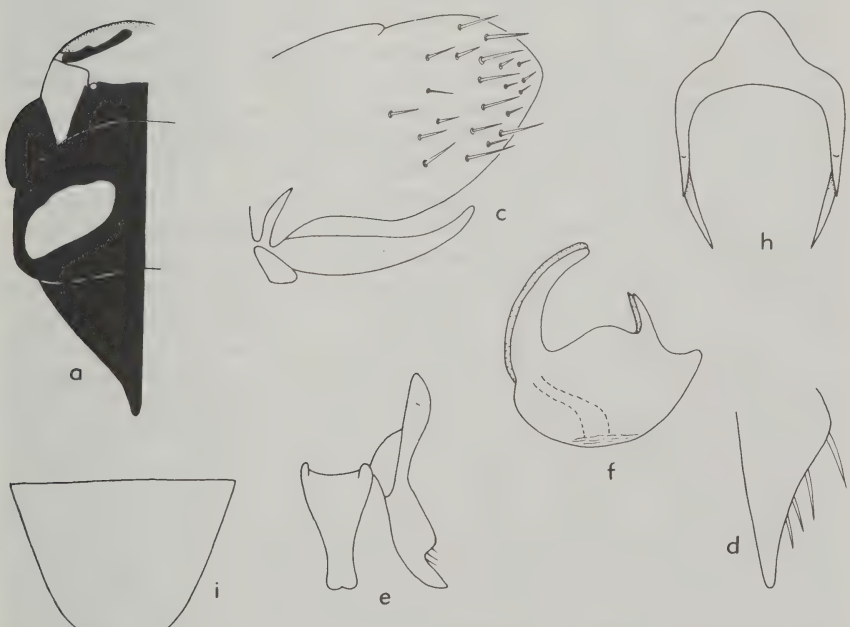


FIGURE 396.—*Subrasaca nigriventris* (Signoret) (from specimens from Brazil; *h* from dorsal view).

66. Genus MESOGONIA Melichar

Figures 397-430

Mesogonia Melichar, 1926a:343. Type-species: *Tettigonia ferrugatula* Breddin, by subsequent designation of China, 1938d:184.

Santarema Melichar, 1926a:344. Type-species: *Tettigonia ferrugatula* Breddin, by present designation.

Length of male 5.6-9.8 mm.

Head with proportions quite variable, median length of crown from four-tenths to more than eight-tenths interocular width and from slightly less than one-fourth to almost one-half transocular width, anterior margin usually subangulate in dorsal view, most often with a distinct carina at transition from crown to face, ocelli variable in location, even intraspecifically, slightly before, slightly behind, or on a line between anterior eye angles, and variable intraspecifically as to relative position between median line of crown and adjacent anterior eye angle, crown almost always with a concavity between or before ocelli, or extending anteriorly from between ocelli, lateral clypeal sutures seldom extending onto crown and then not attaining ocelli; antennal ledges in lateral view with anterior margins nearly always rectilinear and vertical, rarely slightly oblique; clypeus varying from slightly convex to flattened or slightly concave medially, muscle impressions distinct or not, face pubescent or not beneath, transclypeal suture usually indistinct or incomplete, clypellus not produced, its profile continuing contour of clypeus, in some species with slight tumescence.

Thorax with pronotal width usually approximately equal to transocular width of head, in some species distinctly wider, in others slightly narrower, dorsopleural carina distinct and usually extending as far anteriorly as eye margin (varying intraspecifically in a few species, specifically in a few others), posterior margin concave, disk without sculpturing; scutellum not transversely striate behind transverse sulcus. Forewing membranous in some species, in others with membrane usually not clearly delimited anteriorly, grading gradually to texture of wing disk, including apical cells and in many species part of anteapical cells, veins distinct or not, with four apical cells, the base of fourth more proximal than base of third (only slightly so in *M. atramentatula* (Breddin)), outer apical cell subtending more of costal than of apical margin, without an anteapical plexus of veins, texture usually translucent (occasionally coriaceous), without sculpturing. Hindleg with femoral setal formula 2:1:1 (exception: *M. evansi*, n. sp., in which it is 2:0:0); length of first tarsomere greater than combined length of two more distal tarsomeres and with two longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer varying from slightly to strongly produced, posterior margin varying from acutangular to broadly convex, with macrosetae usually occurring only on apical third, very few in some species, with or without processes, arising mesosubapically in those species in which they occur (exception: *M. grapta*, n. sp., in which they arise on posteroventral margins). Plates variable interspecifically in form and in degree to which they extend posteriorly in relation to pygofer, with or without macrosetae which

are usually uniseriate when present (exceptions: *M. grapta,* n. sp., *M. tolosa* (Distant), *M. ludicula* (Osborn), in all of which macrosetae are multiseriate), with microsetae variously distributed. Style variable interspecifically, extending farther posteriorly than apex of connective, with or without preapical lobe. Connective variable interspecifically. Aedeagus symmetrical, rounded or truncate apically, without processes (exception: *M. retrorsa,* n. sp.). Paraphyses present and paired, or weak and membranous and unpaired, rarely absent.

Female (known in only a few species, see discussion below) abdominal sternum VII moderately elongate, with median portion of posterior margin produced posteriorly to a variable degree. Genital chamber without sclerotization in dorsal membrane. Second valvulae variable (see discussion below) but always acute apically.

Mesogonia Melichar stands apart from other genera in the Cicadellini in that the lateral clypeal sutures do not extend to the ocelli, and usually do not extend onto the crown, and in that there is usually a carina present separating the crown from the face. The reduction in number of setae of the male pygofer is also unusual in the Cicadellini. The form of the second valvulae of the ovipositor of some of the few female specimens known to me is that found in many cicadelline leafhoppers (see discussion below), and the departures from this condition now known are correlated with specimens which otherwise possess unusual characters within the genus. Because of similarities in males of some *Mesogonia* species to those of *Juliaca* Melichar, I have placed these genera close in this arrangement. The female genitalia, in the few species known, suggest a possible relationship to *Stehlikiana,* new genus.

Of approximately 1,100 specimens studied, only six females were found: one each in *Mesogonia vinnula,* n. sp., *M. olivatula* (Osborn), and *M. evansi,* n. sp.; one in an unknown species that is very close to *vinnula;* and two in an unknown species which appears very teneral in color, but in which the ovipositor is well sclerotized. In the last two specimens, the second valvulae are narrow at their bases and gradually broadened to the apices which are as in the other three species. In these two colorless specimens, the dorsal primary teeth occur on only the apical half of the second valvula. They are conical in shape, directed posterodorsally, and there are minute secondary denticles between the primaries. In these same two specimens, there are a number of lightly sclerotized somewhat paleate dorsal denticles extending basally from midlength, along the second valvulae to approximately the basal quarter of its length. In the three female specimens with normal color, the second valvulae are shaped like those in the vast majority of cicadelline leafhoppers, broadened abruptly near their bases, their dorsal margins bearing quadrate primary teeth and secondary denticles on the primaries throughout the length of the broadened portion except apically. The apices of the second valvulae of all of the females were alike, acute and with a number of minute angular denticles anteapically on both dorsoanteapical and ventroanteapical margins, a condition found in many other cicadelline genera.

Specimens belongs to *Mesogonia* have been studied from western Brazil, Ecuador, Peru, and Bolivia.

In a number of museums there are specimens of *Mesogonia* from Archidona, Ecuador labeled as cotypes of species attributed to Breddin on the labels. A

number of these species names were never published. Others were doubtfully attributed to Breddin (see Osborn, 1926b, pp. 209, 226, 227, 248).

In a dorsal view of the crown, the dorsal portion of the face is readily visible and this has been shown in the accompanying illustrations as an aid in showing the presence or absence and the extent of the carina which separates the crown from the face.

Except for the structures illustrated here, the genitalia of the male lectotype of *Tettigoniella apulia* Distant are like the present illustrations of *M. semicinctula* (Osborn) (fig. 409). Species misdetermined as *apulia* in MMB have been correctly placed in the Neocoelidiinae by subsequent students of the collection.

The male lectotype of *Tettigonia atramentatula* Breddin has genitalia like the specimen from Pozuzo, Peru illustrated in figure 423. The male genitalia of the lectotype of *Tettigoniella tractatula* Jacobi, of the male lectotype of *Tettigoniella cruentula* Breddin, and of the male holotype of *Tettigoniella thea* Distant are also like the same illustrations.

The genitalia of the male holotype of *Graphocephala attenuata* Osborn are like figure 404.

The male lectotype of *Tettigoniella azeka* Distant is closely related to *M. ferrugatula* (Breddin). The genitalia of this specimen are like the present illustrations of the specimens of *ferrugatula* from Itaituba, Brazil (fig. 397), except that the paraphyses are slightly longer, acute apically, and symmetrical.

The genitalia of the male lectotype of *Tettigoniella braccatula* Jacobi are like the illustrations in figure 402.

I have not seen either the type or the paratype of *Mesogonia brevisula* (Osborn), nor any determined specimens of this species. There is a possibility that it may preempt the new species, *M. suspecta,* described below.

The genitalia of the male holotype of *Graphocephala cardinula* Osborn are like figure 425.

Mesogonia ferrugatula (Breddin) is an extremely variable species both in color pattern and the degree to which the pygofer processes of the male are developed. The latter vary from fairly well developed as in the specimen from Archidona, Ecuador (fig. 397*q-t*) to completely absent in a specimen from Yungas de Palmar, Bolivia (not illustrated). The genitalia of the male lectotype of this species are as in the present illustrations of the specimen from Coroico, Yungas, Bolivia (fig. 397*c, h*). The form of the aedeagus is the most important character for the identification of this species. The holotypes of both *Graphocephala simillima* Osborn and *G. contractula* Osborn have male genitalia falling within the range of variation of *ferrugatula.*

The holotype of *Graphocephala involuta* Osborn has male genitalia which agree well with figure 416, as does the holotype of *G. separata* Osborn. The holotype of *G. affinula* Osborn is identical to the holotype of *separata* in external characters.

The male lectotype of *Kolla ithra* Distant has genitalia like the present illustration of the specimen of *M. ferrugatula* (Breddin) from Itaituba, Brazil. The specimen was compared with the lectotype of *M. azeka* (Distant), with closely similar genitalia. The head of *ithra* is much more produced than *azeka,*

and these two nominal species are therefore not placed in synonymy. There is a possibility that both should be synonymized with *ferrugatula,* but a good series of the last should be compared with the two lectotypes before such an action is taken and hence all three nominal species are considered valid at present.

The genitalia of the male lectotype of *Tettigonia larvatula* Breddin are like the illustrations of the genitalia of the lectotype of *Tettigoniella personatula* Jacobi published here. In this species the male plates vary in the degree to which they are truncate apically and in whether the apical margin is convex or transversely rectilinear. The anteapical dorsal lobe of the pygofer may be well developed or not.

Topotypic specimens of *Mesogonia ludicula* (Osborn) which agree well with the original description and illustrations are the basis of the present interpretation of this species. The present interpretation of *M. olivatula* (Osborn) is also based on the literature.

The male genitalia of the lectotype of *Tettigoniella paganula* Jacobi are like figure 412. I placed a lectotype label on a male of *Graphocephala plebejula* Osborn, from the Ohio State University collection. It bore labels: "Archidona/(Ecuad.)/R. Haensch S." and "Herbert/Osborn/Collection" and "Tettigonia/plebejula/Bredd.". It agrees closely in external characters with specimens of *M. paganula* (Jacobi). The Breddin name was never published.

The present interpretation of *Mesogonia semicinctula* (Osborn) rests on a gross comparison of a specimen of which the genitalia are illustrated in figure 409 with a specimen of *Cicadella semicinctula* Osborn in the Ohio State University collection. I placed a lectotype label on the latter. It bears labels: "Chulumani/Bolivia/Nov. (date illegible) '98" and "1019♂" and"Holotype/Cicadella/semicinctula/Osborn" and "Herbert/Osborn/Collection". The species is distinctly marked externally. The male genitalia and the anterior dorsum of the lectotype of *Tettigoniella cornelia* Distant, a preoccupied name, agree well with the specimen from Itaituba, Brazil illustrated in figure 409.

Mesogonia stillatula (Breddin) is a species which is distinctively marked externally. The lectotype, without abdomen, agrees with the illustration (fig. 422) of the syntype from USNM, as does the lectotype of *Tettigoniella grandinula* Jacobi.

The genitalia of the male lectotype of *T. tolosa* Distant agree with figure 410. The holotype of *Graphocephala curvatula* Osborn is the same externally as specimens of *tolosa.*

SPECIES OF *MESOGONIA*

aliena, n. sp. Ecuador.
apulia (Distant), 1908a:523 *(Tettigoniella).* Ecuador.
atramentatula (Breddin), 1901h:107 *(Tettigonia).* Peru, Bolivia.
cruentula (Breddin), 1905c:182 *(Tettigoniella).* New synonymy.
tractatula (Jacobi), 1905c:182 *(Tettigoniella).* New synonymy.
thea (Distant), 1908a:520 *(Tettigoniella),* New synonymy.
attenuata (Osborn), 1926b:222 *(Graphocephala).* Peru, Bolivia. New combination.
azeka (Distant), 1908a:523 *(Tettigoniella).* Peru. New combination.
bicornuta, n. sp. Peru.

braccatula (Jacobi), 1905c:181 *(Tettigoniella)*. Brazil, Peru, Bolivia.
brevicorne, n. sp. Peru.
brevisula (Osborn), 1926b:223 *(Graphocephala)*. Ecuador. New combination.
callangana, n. sp. Peru.
cardinula (Osborn), 1926b:226 *(Graphocephala)*. Peru, Bolivia. New combination.
charapensis, n. sp. Peru.
emarginata, n. sp. Bolivia.
evansi, n. sp. Peru, Bolivia.
ferrugatula (Breddin), 1901h:107 *(Tettigonia)*. Brazil, Ecuador, Peru, Bolivia.
simillima (Osborn), 1926b:222 *(Graphocephala)*. New synonymy.
contractula (Osborn), 1926b:224 *(Graphocephala)*. New synonymy.
grapta, n. sp. Bolivia.
involuta (Osborn), 1926b:223 *(Graphocephala)*. Brazil, Peru, Bolivia. New combination.
affinula (Osborn), 1926b:225 *(Graphocephala)*. New synonymy.
separata (Osborn), 1926b:226 *(Graphocephala)*. New synonymy.
itaitubana, n. sp. Brazil, Peru.
ithra (Distant), 1908a:530 *(Kolla)*. Peru. New combination.
larvatula (Breddin), 1902a:178 *(Tettigonia)*. Peru, Bolivia.
personatula (Jacobi), 1905c:181 *(Tettigoniella)*. New synonymy.
lobata, n. sp. Peru.
longula (Osborn), 1926b:225 *(Graphocephala)*. Peru, Bolivia. New combination.
ludicula (Osborn), 1926b:226 *(Graphocephala)*. Ecuador. New combination.
monsonensis, n. sp. Peru, Bolivia.
olivatula (Osborn), 1926b:209 *(Cicadella)*. Ecuador, Peru. New combination.
paganula (Jacobi), 1905c:185 *(Tettigoniella)*. Brazil, Ecuador.
plebejula (Osborn), 1926b:227 *(Graphocephala)*. New synonymy.
pruriginosula (Jacobi), 1905c:181 *(Tettigoniella)*. Peru, Bolivia.
retrorsa, n. sp. Peru.
rondosa, n. sp. Peru.
semicinctula (Osborn), 1926b:215 *(Cicadella)*. Brazil, Peru, Bolivia.
cornelia (Distant), 1908a:521 *(Tettigoniella)* (preoccupied). New synonymy.
distanti (Metcalf) 1955a:264 *(Tettigella)* (new name). New synonymy.
semilucida, n. sp. Peru.
stillatula (Breddin), 1902b:2 *(Tettigonia)*. Ecuador, Peru, NE. Brazil.
grandinula (Jacobi), 1905c:182 *(Tettigoniella)*. New synonymy.
suspecta, n. sp. Peru, Bolivia.
tolosa (Distant), 1908a:521 *(Tettigoniella)*. Peru, Bolivia.
curvatula (Osborn), 1926b:224 *(Graphocephala)*. New synonymy.
valida, n. sp. Ecuador, Peru.
vexativa, n. sp. Peru, Bolivia.
vinnula, n. sp. Ecuador, NE. Brazil.

KEY TO MALES OF *MESOGONIA*

(*Mesogonia brevisula* (Osborn) not included)

1. Aedeagus in lateral view slender and elongate, without process, its apical portion curved posteroventrally, its dorsal margin broadly and regularly convex almost to apex ..... *ferrugatula* (Breddin) (fig. 397)
azeka (Distant)
ithra (Distant)

Aedeagus in lateral view not as above 2

2. Plates abruptly truncate or abruptly rounded apically (figs. 398*d* and *q*) in ventral view ..... *larvatula* (Breddin) (fig. 398)
Plates not so 3

3. Aedeagus with a pair of retrorse processes on shaft (figs. 399*f* and 400*f*) 4
Aedeagus without anteapical shaft processes 5

4. Plates longer and each with a dorsal convexity near midlength in lateral view ..... *longula* (Osborn) (fig. 399)
Plates shorter and each with a small anteapical convexity (fig. 400*c*) *retrorsa,* n. sp., page 489

5. Pygofer with a pair of conspicuous processes arising posteroventrally, curved gradually dorsally and slightly anteriorly (fig. 401*c*) *grapta,* n. sp., page 491
Pygofer without process *or* if present, then arising apically, dorsoapically, ventromedially, or dorsomedially and extending medially 6

6. Pygofer with a pair of apical or anteapical processes extending medially (not merely angular modifications of pygofer apex itself) (figs. 402*p*, 404*p*, and 406*p*) 7
Pygofer with apex unmodified, or narrowed and angular, or lobate, not with apical processes extending medially 13

7. Aedeagus in lateral view almost straight (fig. 402*f*) *braccatula* Jacobi (fig. 402)
Aedeagus much more strongly curved in lateral view 8

8. Pygofer process in dorsal view short, tightly curved (fig. 403*p*) *semilucida,* n. sp., page 492
Pygofer process much narrower in dorsal or caudoventral view, not as tightly curved 9

9. Pygofer elongate and slender in lateral view, apical margin very sharply rounded in lateral view (figs. 404*c* and 405*c*) 10
Pygofer with apical margin much more broadly rounded or truncate in lateral view (fig. 407*c*) 11

10. Pygofer in lateral view with an anteapical concavity on posteroventral margin (fig. 404*c*) ..... *attenuata* (Osborn) (fig. 404)
Pygofer in lateral view with posteroventral margin convex anteapically *apulia* (Distant) (fig. 405)

11. Pygofer in caudoventral view with apex angulate apically (fig. 406*p*) *bicornuta,* n. sp., page 495
Pygofer in caudoventral view rounded apically 12

12. Pygofer in ventral view with apical process comparatively long and curved through 90°; crown of head with median line dark *charapensis,* n. sp., page 497
Pygofer in caudoventral view with apical process much shorter (fig. 408*p*); crown of head with median line not dark *brevicorne,* n. sp., page 497

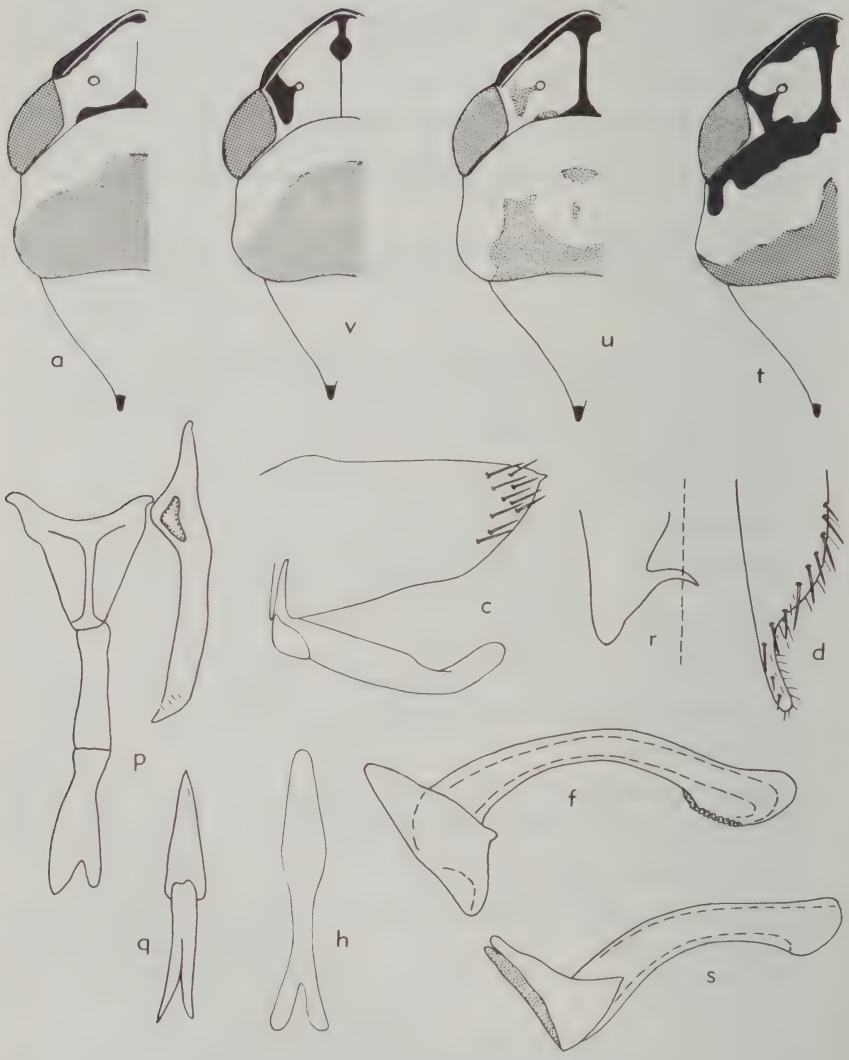


FIGURE 397.—*Mesogonia ferrugatula* (Breddin) (*a*, *c*, *h*, from specimen from Coroico Yungas, Bolivia; *d*, *f*, *p*, from Itaituba, Brazil; *q-t*, from Archidona, Ecuador; *u*, *v*, from Monsón Valley, Peru; *h* from dorsal view): *p*, Style, connective, and paraphyses, from dorsal view; *q*, paraphyses from dorsal view; *r*, pygofer apex, right side, from caudoventral view; *s*, aedeagus from lateral view; *t-v* anterior dorsum.

13. Posterior femoral setal formula 2:0:0 ..... *evansi*, n. sp., page 519
Posterior femoral setal formula 2:1:1 14

14. Pygofer produced dorsoapically and not differentially sclerotized nor extending away from surface of pygofer as process 15
Pygofer without a dorsoapical production 16

15. Plates narrowly rounded apically in ventral view (figs. 409*d* and *t*), pronotum with pale submarginal stripe parallel to posterior margin *semicinctula* (Osborn) (fig. 409)
Plates more broadly rounded apically (fig. 410*d*), pronotum without such a stripe ..... *tolosa* (Distant) (fig. 410)

16. Plate with a strong dorsal sclerite which articulates with connective; aedeagus short, abruptly expanded in apical half in lateral view, truncate apically ..... *aliena*, n. sp., page 499
Without the above combination of characters 17

17. Plates abruptly narrowed in basal one-third of their length in ventral view 18
Plates not as above, if narrowed basally, then gradually so 19

18. Aedeagus in lateral view very short, very broadly expanded and truncate apically (fig. 412*f*) ..... *paganula* Jacobi (fig. 412)
Aedeagus much longer, scarcely expanded apically (fig. 413*f*) *emarginata*, n. sp., page 501

19. Aedeagus broadly expanded and truncate apically in lateral view 20
Aedeagus not broadly expanded and truncate apically in lateral view 22

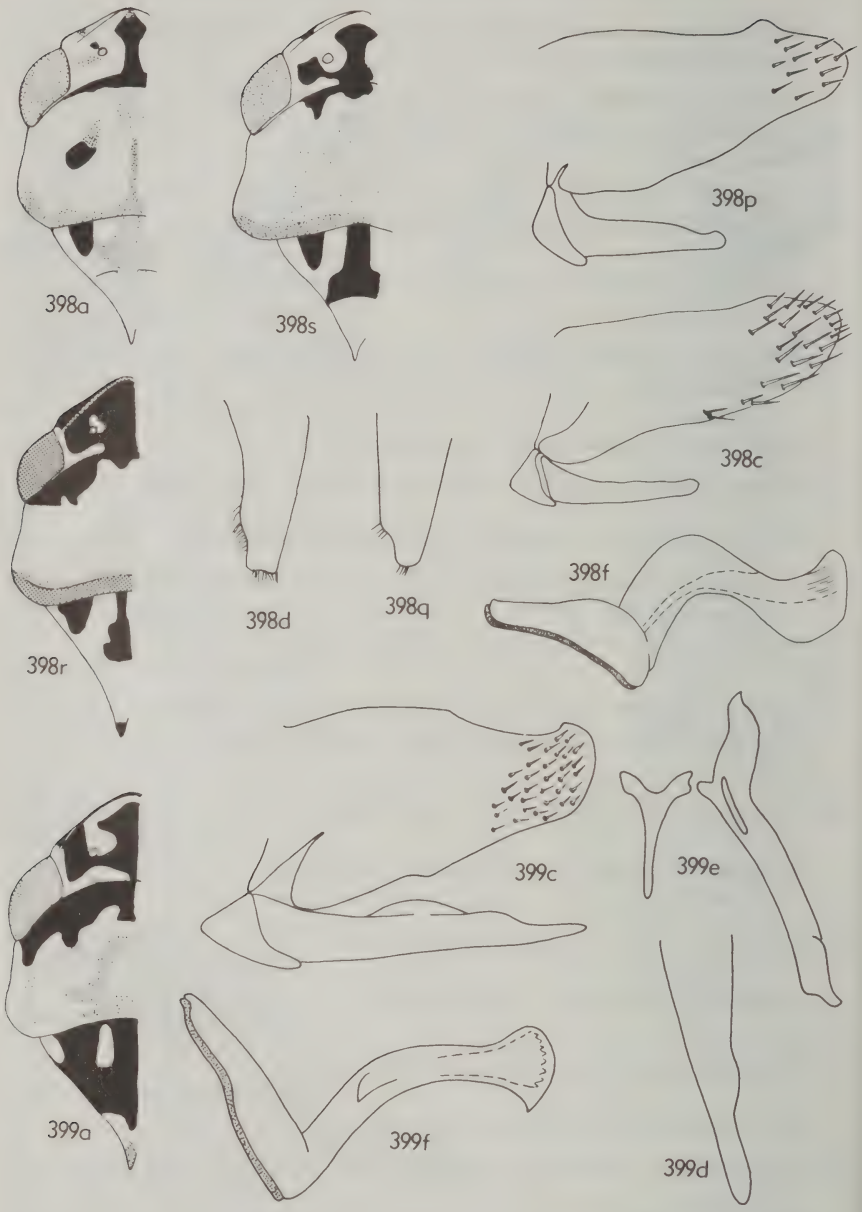
20. Aedeagus in lateral view with dorsal margin concave at midlength (fig. 414*f*) ..... *valida*, n. sp., page 504
Aedeagus in lateral view with dorsal margin convex at midlength (figs. 415*f* and 416*f*) 21

21. Pronotum with a broad black marginal stripe on posterior margin, scutellum unmarked ..... *callangana*, n. sp., page 504
Pronotum without such a stripe, scutellum marked with black *involuta* (Osborn) (fig. 416)

22. Style very greatly expanded apically (fig. 417*p*) *itaitubana*, n. sp., page 506
Style not or much less expanded apically 23

23. Style abruptly narrowed at midlength (fig. 419*e*) apical half slender and sinuate ..... *monsonensis*, n. sp., page 508
Style not as above 24

24. Style with pronounced preapical lobe and an abruptly more slender tapered acute apical extension (fig. 418*e*) ..... *lobata*, n. sp., page 509
Style without a preapical lobe, *or* if present, then with apical extension less abruptly narrowed and not as slender 25



FIGURES 398, 399.—398, *Mesogonia larvatula* (Breddin) (*a*, *c*, *d*, *f*, from specimen from Coroico Yungas, Bolivia; *p*, *q*, from lectotype of *Tettigoniella personatula* Jacobi; *r*, *s*, from Yungas de Palmar, Bolivia): *p*, Male pygofer and plate, from lateral view; *q*, plate from ventral view; *r*, *s*, anterior dorsum. 399, *M. longula* (Osborn), holotype.

25. Pygofer with dorsoapical margin concave anteapically (fig. 420*c*) *vexativa*, n. sp., page 511
Pygofer not so 26

26. Pygofer very long and gradually tapered (fig. 421*c*) *rondosa*, n. sp., page 513
Pygofer shorter and less gradually tapered 27

27. Aedeagus with dorsal margin regularly convex in apical seven-eighths (fig. 422*f*) ..... *stillatula* (Breddin) (fig. 422)
Aedeagus with dorsal margin biundulate in apical seven-eighths (fig. 423*f*) 28

28. Pronotum tawny with at least two transverse pale stripes (may be interrupted) ..... *atramentatula* (Breddin) (fig. 423)
Pronotum not so 29

29. Dorsum without any green markings 30
Dorsum with at least some green coloration 31

30. Pronotum black with a large basilateral orange spot on each side (fig. 424*a*); aedeagus with dorsal margin strongly convex near base *pruriginosula* (Jacobi) (fig. 424)
Pronotum with orange markings more extensive or with ground color orange; aedeagus with dorsal margin much less and more broadly convex (fig. 425*f*) ..... *cardinula* (Osborn) (fig. 425)

31. Forewing without orange vittae 32
Forewing with orange vittae 33

32. Plate in ventral view gradually narrowed in basal half (fig. 426*c*) *vinnula*, n. sp., page 515
Plate in ventral view abruptly narrowed in apical third (fig. 427*d*) *olivatula* (Osborn) (fig. 427)

33. Face entirely black (Ecuador) ..... *ludicula* (Osborn) (fig. 428)
Face with clypeus partly pale, (Peru, Bolivia) *suspecta*, n. sp., page 517

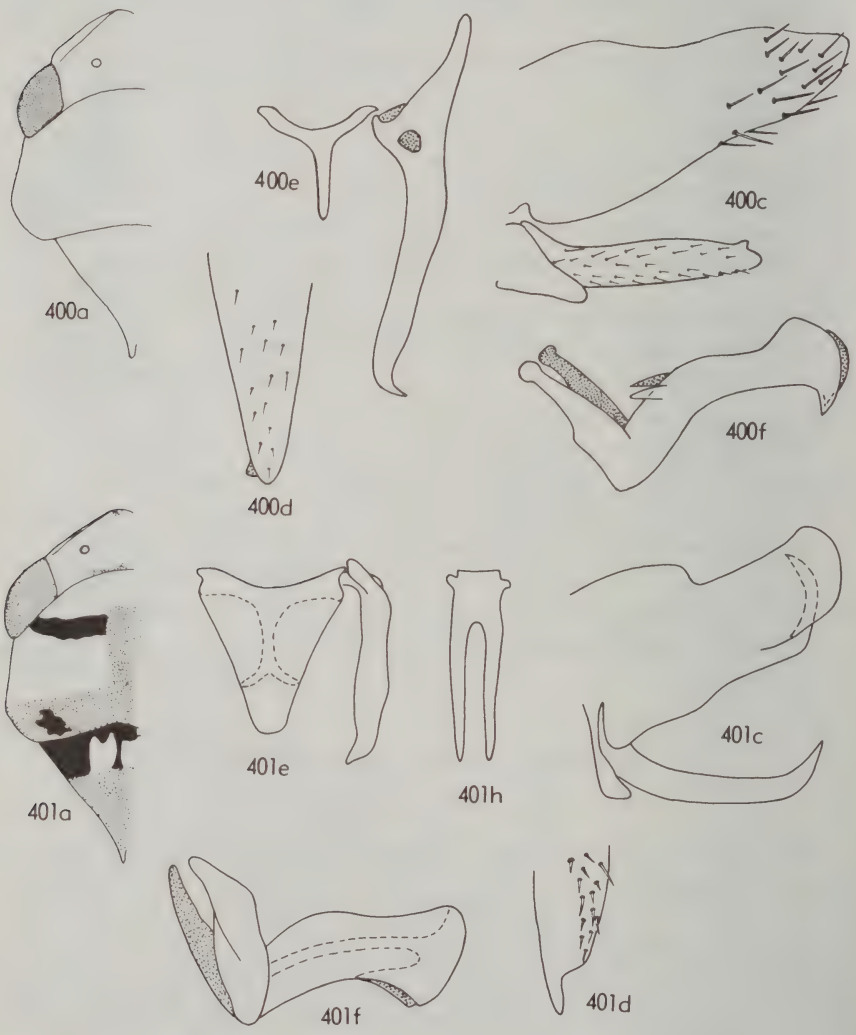
Mesogonia retrorsa, NEW SPECIES

FIGURE 400, PAGE 490

Length of male 6.6 mm. Head with median length of crown slightly less than six-tenths interocular width and slightly more than one-third transocular width, anterior margin subangulate in dorsal view, with a distinct carina at transition from crown to face, ocelli located on a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown shallowly concave between ocelli, the concavity extending to apical carina, lateral clypeal sutures not extending onto crown; antennal ledges with anterior margins vertical in lateral view; clypeus slightly convex medially, muscle impressions indistinct; face not pubescent beneath (possibly

rubbed or with pubescence matted), transclypeal suture indistinct, clypellus not tumid. Thorax with pronotum distinctly wider than head, dorsopleural carina not extending anteriorly as far as eye margin; forewing membranous with veins distinct.

Male pygofer strongly produced, dorsoapical margin subangularly rounded, with more than fifteen anteapical macrosetae, without processes; plates not extending as far posteriorly as pygofer apex, with an anteapical dorsal lobe very near apex in lateral view, each in ventral view gradually tapered from base to apex, with a number of microsetae; style extending posteriorly



FIGURES 400, 401.—400, *Mesogonia retrorsa*, n. sp., holotype. 401, *M. grapta*, n. sp., holotype (*h* from dorsal view).

much farther than apex of connective, without preapical lobe, gradually narrowed to acute apex which is curved at nearly a right angle to axis of shank; connective Y-shaped with arms widely divergent; aedeagus arched slightly ventrally, apex expanded and with a pair of acute short ventral processes; with a pair of short retrorse acute processes near base; paraphyses absent. Female unknown.

Crown and pronotum tan, with poorly defined transverse darker areas on basal half and parallel to posterior margin of pronotum; scutellum dull brown, forewings translucent with veins brown; face yellow with a small black spot beneath dorsal carina; thoracic pleura and legs yellow.

Holotype male, Callanga, Peru (USNM).

M. retrorsa, n. sp., differs from all other species in the genus in its basal aedeagal shaft processes.

Mesogonia grapta, NEW SPECIES

FIGURE 401, PAGE 490

Length of male 7.0 mm. Head with median length of crown slightly more than four-tenths interocular width and approximately one-fourth transocular width, ocelli located before a line between anterior eye angles, each closer to median line than to adjacent anterior eye angle, crown convex between ocelli, very shallowly concave behind apical carina, clypeus convex medially, transclypeal suture distinct. Thorax with pronotum narrower than head, dorsopleural carina extending anteriorly to eye margin; forewing coriaceous with veins indistinct. Other external anatomical characters as in *M. retrorsa,* n. sp.

Male pygofer strongly produced and convexly truncate apically, without setae, with a slender process arising on ventral margin, extending dorsally and curved slightly anteriorly and acute apically; plates not extending nearly as far posteriorly as pygofer apex, without a dorsal lobe in lateral view, each in ventral view abruptly narrowed near apex, with a number of multiseriate macrosetae; style extending posteriorly slightly farther than apex of connective, without preapical lobe, gradually narrowed and subacutangular at apex; connective triangular; aedeagus very short compared with other species in the genus, broad, slightly arched and slightly broadened at truncate apex in lateral view; paraphyses not stalked, with a small lateral convexity on each side basally.

Crown and pronotum dull yellow with an angular small spot at apex of crown, a small narrow black marking on carina nearly midway between apex and anterior eye angle and a narrow median marking along posterior margin with a median short angular projection, black; pronotum with a narrow transverse arcuate dark stripe extending across basal half, interrupted medially by a castaneous area which extends posteriorly along the midline then laterally along posterior margin and surrounds an irregular black marking on each side; scutellum black in basal half, castaneous in apical half, a pair of irregular spots in basal half and extreme apical portion, yellow; forewing dark, with a narrow subcostal stripe extending apically to a point opposite claval apex, humeral and commissural margins and a broad stripe along

longitudinal axis, yellow; face yellow with a short median apical vitta below dorsal carina, a narrow stripe on clypeus on each side parallel to lateral clypeal suture and confluent with its complement below to form a median stripe on clypellus, black; thoracic pleura and legs, yellow. Female unknown.

Holotype male, Bolivia (MMB). One male, Coroico, Yungas, Bolivia (OSU).

M. grapta, n. sp., differs from all other species in the genus in that the male pygofer bears processes which arise on the ventral margin.

Mesogonia semilucida, NEW SPECIES

FIGURE 403

Length of male 8.5-9.1 mm. Head with median length of crown varying from less than one-half (holotype) to more than six-tenths interocular width and from slightly more than one-fourth (holotype) to more than one-third transocular width, ocelli located on a line between anterior eye angles and each equidistant from adjacent anterior eye angle and median line of crown, crown concave in area before ocelli and behind anterior carina; clypeus with

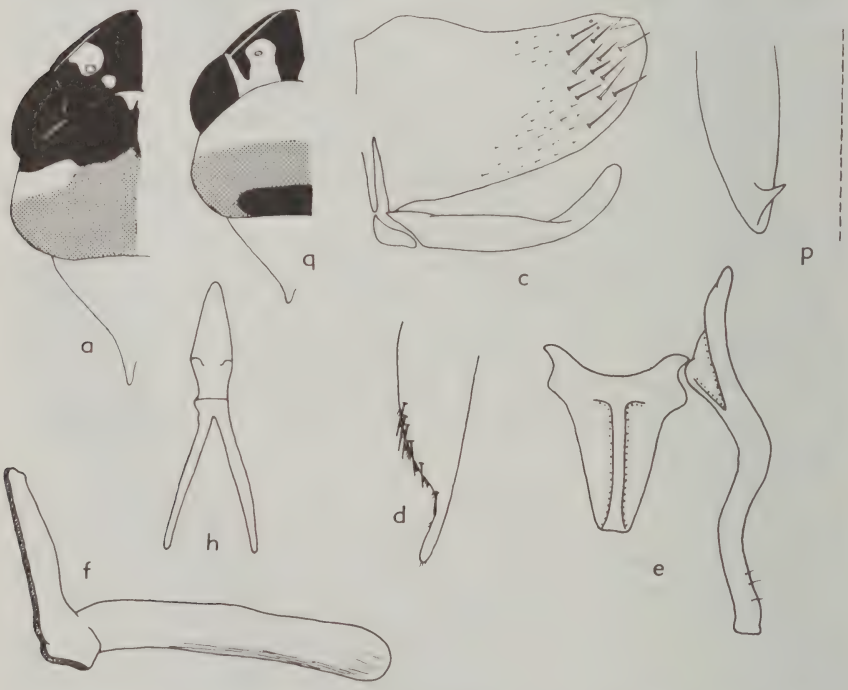


FIGURE 402.—*Mesogonia braccatula* (Jacobi) (*a* from specimen from Tingo María, Peru; remainder from Itaituba, Brazil): *p*, Male pygofer apex, left side, from dorsal view; *q*, anterior dorsum.

muscle impressions distinct or not; face with short pubescense beneath and on genae and lora, transclypeal suture indistinct medially. Thorax with pronotal width approximately equal to width of head; forewing membranous in basal third, with apical membrane including all of apical cells. Other external characters as in *M. retrorsa,* n. sp.

Male pygofer moderately produced with apex rounded, with more than fifteen anteapical macrosetae, with a very short curved undifferentially sclerotized dorsoapical process extending mesally then apically; plates extending posteriorly almost as far as posterior pygofer margin, each with a weak convexity near midlength in lateral view, in ventral view gradually tapered in basal half, with uniseriate macrosetae; style extending posteriorly slightly farther than apex of connective, without preapical lobe, narrowly rounded apically; connective elongate triangular, with a median keel; aedeagus biundulate in lateral view with the apical portion expanded and convex at apex; paraphyses vestigial, represented by a short sclerite at apex of connective. Female unknown.

Crown yellow with variable black markings, anterior margin usually bordered narrowly with black (type) and median line broadly (type) black and usually with an oblique dark line extending posterolaterally from ocelli and occasionally continuing anteriorly parallel to inner eye margin; pronotum

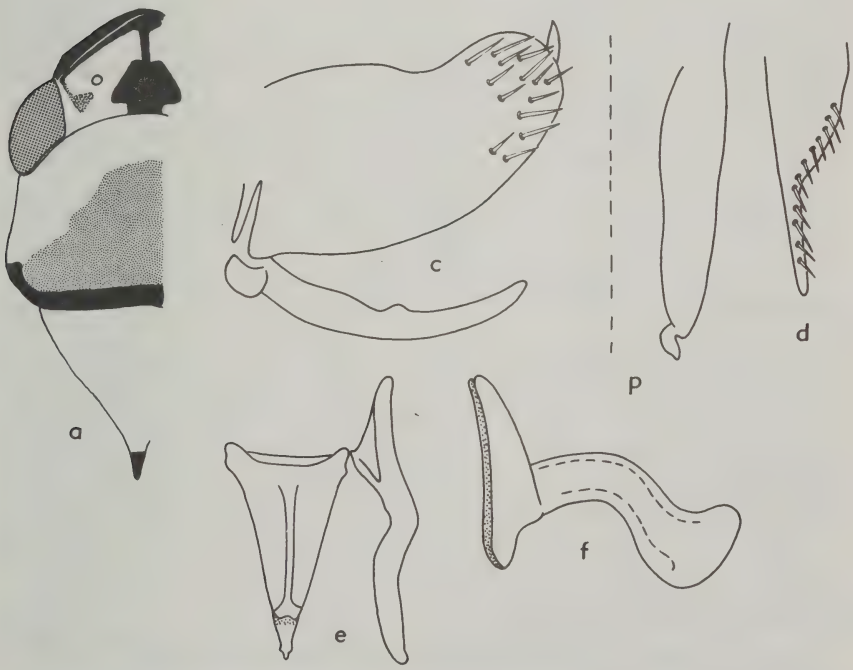
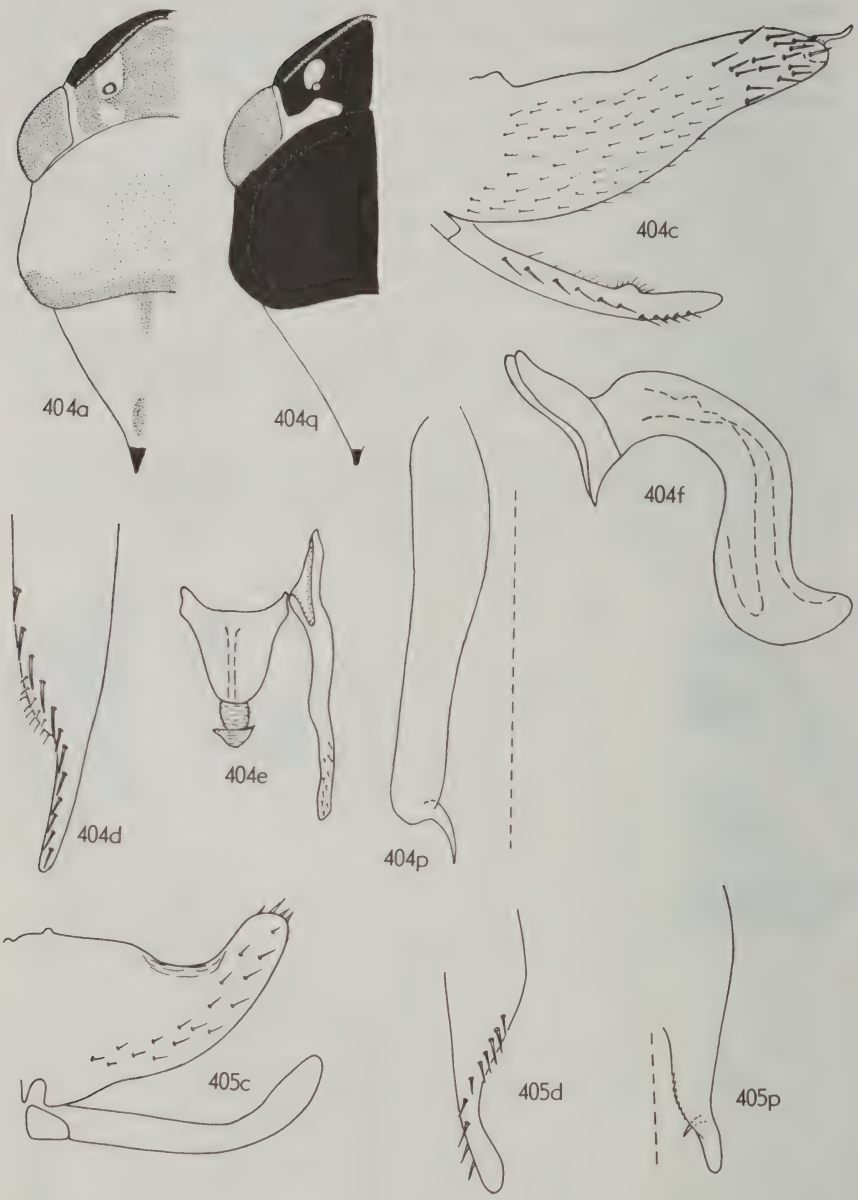


FIGURE 403.—*Mesogonia semilucida,* n. sp., holotype: *p,* Male pygofer apex, right side, from dorsal view.



FIGURES 404, 405.—404, *Mesogonia attenuata* (Osborn) (*q* from specimen from Peru; remainder from holotype; vestigial paraphysis shown in *e*): *p*, Male pygofer, right side, from ventral view; *q*, anterior dorsum. 405, *M. apulia* (Distant), lectotype: *p*, Male pygofer, left side, from caudoventral view.

golden, with posterior margin and often (not in type) with a median line extending anteriorly to midlength and giving off a branch to each side parallel to anterior margin, black; scutellum golden, apex black; forewing black on approximately middle one-third, membranous at base and at apex, the apical membrane including all of apical cells and a variable portion of anteapical cells; face entirely black, thoracic pleura black except for portion of proepimeron and mesepisternum which are yellow; legs partly yellow and partly black.

Holotype male, Monsón Valley, 10 XI 1954, Tingo María, Peru (E. I. Schlinger and E. S. Ross) and a series of six topotypic males, November 10, 1954; November 29, 1954; October 26, 1954, and December 9, 1954 (same collectors) (CAS).

M. semilucida, n. sp., one of the largest species in the genus, is very similar externally to *M. attenuata* (Osborn) from which the male differs in its shorter and broader pygofer, its shorter aedeagus and shorter styles, and to *M. ferrugatula* (Breddin) from which the male may be most readily separated by the strongly biundulate dorsal margin of its aedeagus.

Mesogonia bicornuta, NEW SPECIES

FIGURE 406, PAGE 496

Length of male 8.1-8.6 mm. Head with median length of crown slightly more than one-half interocular width and from slightly less to slightly more than one-third transocular width, without a distinct carina at transition from crown to face, ocelli located on a line between anterior eye angles and either equidistant from median line of crown and adjacent anterior eye angle or slightly closer to latter (type), surface of crown sloping gradually towards anterior margin, not concave, lateral clypeal sutures barely extending onto crown; antennal ledges not carinate dorsally; face weakly pubescent beneath, transclypeal suture distinct. Thorax with pronotum narrower than head, dorsopleural carina extending anteriorly to eye margin; forewing coriaceous except apically, veins indistinct. Other external anatomical characters as in *M. retrorsa,* n. sp.

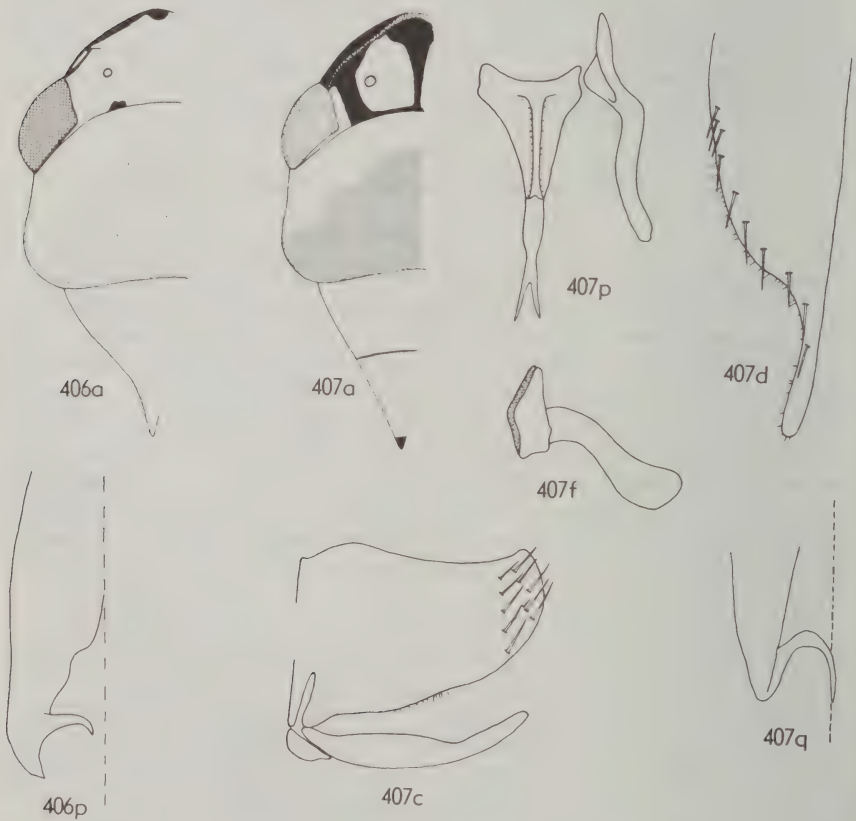
Male pygofer not strongly produced, apical margin broadly rounded, with a few anteapical macrosetae, with an apical bifid process on each side; plates extending almost as far posteriorly as pygofer apex, without a dorsal lobe in lateral view, each tapered in apical half in ventral view, with uniseriate macrosetae in apical two-thirds and with a number of short lateral microsetae; style extending posteriorly beyond apex of connective, without preapical lobe, subacute at apex; connective elongate-triangular, keeled; aedeagus biundulate in lateral view, slightly expanded at apex and with apical margin rounded; paraphyses stalked, rami short and slightly asymmetrical. Female unknown.

Crown, pronotum and scutellum, dull yellow, partly suffused with orange, the pronotum with a large sordid green area covering most of surface except anterior margin; forewings black, fading to tan over clavus, commissural

margin dull yellow, apical membrane smoky; face and thoracic pleura black with dull yellow areas on proepimeron and mesepisternum; legs yellow marked with black.

Holotype male, Monsón Valley, Tingo María, Peru, October 26, 1954, (E. I. Schlinger and E. S. Ross) and two topotypic males, November 10, 1954 and December 9, 1954, same collectors (CAS).

M. bicornuta, n. sp., is closely related to *M. charapensis*, n. sp. (below), from which it differs in the absence of a membranous area at the bases of the forewings and in its bifid pygofer process. The genital characters not illustrated are like those illustrated for *charapensis*.



FIGURES 406, 407.—406, *Mesogonia bicornuta*, n. sp., holotype: *p*, Male pygofer, right side, from caudoventral view. 407, *M. charapensis*, n. sp., holotype: *p*, Style, connective, and paraphyses, from dorsal view; *q*, male pygofer apex, left side, from ventral view.

Mesogonia charapensis, NEW SPECIES

FIGURE 407, PAGE 496

Length of male 7.8-8.1 mm. Head with median length of crown from six-tenths to three-fourths (type) interocular width and from slightly more than one-third to more than four-tenths (type) transocular width, ocelli located on a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle; antennal ledges with anterior margins slightly oblique in lateral view; clypeus distinctly concave medially. Thorax with pronotum not as wide as head; forewing membranous basally and apically with veins not very distinct. Other external anatomical characters as in *M. retrorsa,* n. sp.

Male genitalia closely similar to those of *M. bicornuta,* n. sp. (see above), except that the pygofer process is not bifid. Female unknown.

Crown black with a large yellow area on each side of disk and narrow yellow stripe bordering each inner eye margin; pronotum and scutellum yellow with a dark area over posterior two-thirds of pronotum, scutellar apex black; forewing membranous in basal third and at apex, remainder black with a narrow dull orange stripe bordering costal margin; face and thoracic pleura black with sordid paler markings on proepimeron and mesepisternum. Legs yellow marked with black.

Holotype male and five additional males, Río Charapa, Peru, September 12-16, 1911 (C. H. T. Townsend) (USNM).

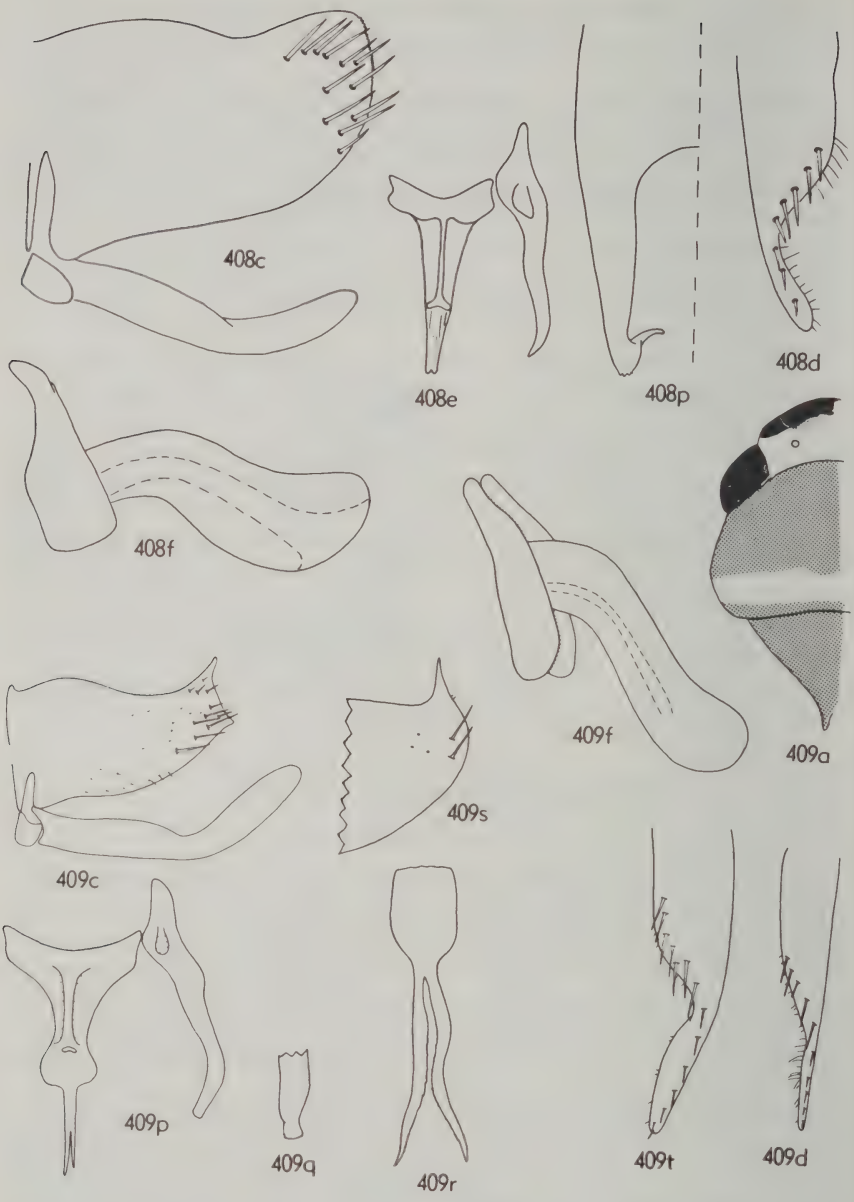
M. charapensis, n. sp., is related to *bicornuta* (above), in the discussion of which distinguishing characters are set forth.

Mesogonia brevicorne, NEW SPECIES

FIGURE 408, PAGE 498

Length of male 7.8 mm. Head with median length more than six-tenths interocular width and approximately one-third transocular width, carina at transition from crown to face not very distinct, ocelli located slightly behind a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle; clypeus flattened medially, muscle impressions indistinct. Thorax with pronotum not as wide as head, dorsopleural carina extending forward to eye margin; forewing coriaceous except apically. Other external anatomical characters as in *M. retrorsa,* n. sp.

Male pygofer moderately produced, posterior margin broadly rounded, with few anteapical macrosetae, with a short apical acute process extending mesally; plates extending as far posteriorly as pygofer apex, without a dorsal lobe in lateral view, each gradually tapered at midlength, with uniseriate macrosetae and a number of lateral microsetae; style extending posteriorly farther than apex of connective, without preapical lobe, gradually tapered to acute apex; connective Y-shaped with arms widely divergent, keeled medially; aedeagus slightly biundulate, in lateral aspect gradually broadened in apical two-thirds, apex broadly rounded, without processes; paraphyses vestigial. Female unknown.



FIGURES 408, 409.—408, *Mesogonia brevicorne*, n. sp., holotype: *p*, Male pygofer, left side, from dorsal view. 409, *M. semicinctula* (Osborn) (*q-t*, from specimen from Tingo María, Peru; remainder from Itaituba, Brazil): *p*, Style, connective, and paraphyses, from dorsal view; *q*, style apex; *r*, paraphyses from dorsal view; *s*, male pygofer apex from lateral view; *t*, male plate.

Crown and anterior portion of pronotum sordid yellow, posterior two-thirds of pronotum fuscous, scutellum dull fuscous to sordid dark yellow; forewings with clavus and a narrow subcostal stripe dull yellow, corium black in basal half; face and thoracic pleura black, legs brown.

Holotype male, "Peru" (RMS).

M. brevicorne, n. sp., is related to *M. ferrugatula* (Breddin) from which it can be distinguished readily by the shape of the aedeagus, and externally by its lack of a membranous area on the base of the forewing.

Mesogonia aliena, NEW SPECIES

FIGURE 411, PAGE 500

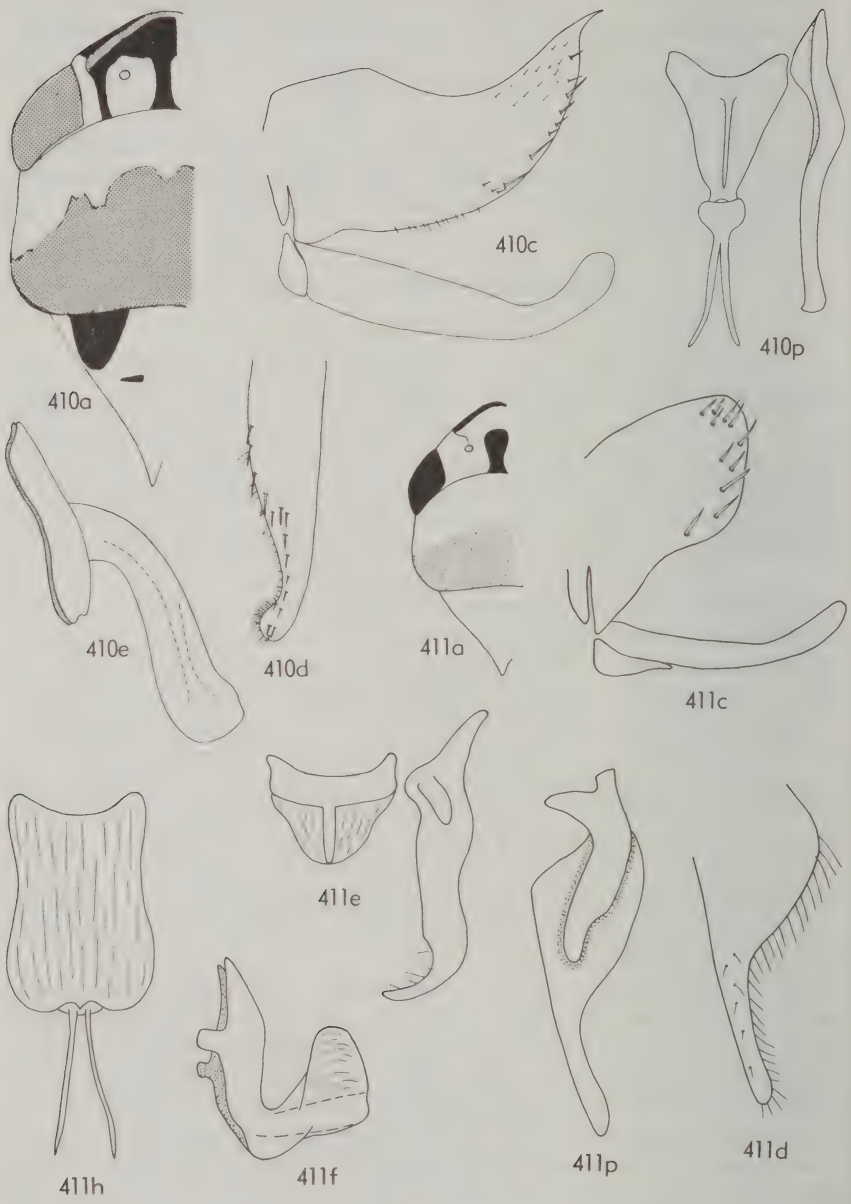
Length of male 5.6 mm. Head with median length of crown three-fourths interocular width and slightly more than one-half transocular width, ocelli located behind a line between anterior eye angles, crown shallowly concave before ocelli and behind apical carina, lateral clypeal sutures extending onto crown, almost attaining ocelli; clypeus slightly flattened medially, muscle impressions distinct; face not pubescent beneath (possibly rubbed). Thorax with pronotum not wider than head, forewing coriaceous with veins distinct. Other external anatomical characters as in *M. retrorsa,* n. sp.

Male pygofer not strongly produced, posterior margin subtruncate, with a few anteapical submarginal macrosetae near posterior margin; plates extending much farther posteriorly than pygofer apex, without an anteapical dorsal lobe, each in ventral view abruptly tapered in basal half, with a number of microsetae, dorsal surface of plate with a conspicuous sclerite extending over basal third; style extending posteriorly much farther than apex of connective, without preapical lobe, abruptly narrowed in apical portion to subacute apex which is at nearly a right angle to axis of shank; connective semi-oval, with a sclerotized Y-shaped portion; aedeagus short, its dorsal apodemes each with a short lobate anterior projection, expanded abruptly at midlength to a broad truncate apex, without processes; paraphyses consisting of a broad basal piece and a pair of slender aciculate and slightly divergent rami. Female unknown.

Crown and anterior third of pronotum dull yellow, latter tinged with orange medially, with anterior margin of crown from apex to lateral clypeal suture on each side, and a median marking extending from base to just before ocelli and rounded apically, black, posterior half of pronotum dull green (scutellum obscured by pin); forewing dull green except broad dull translucent brown claval area parallel to commissural margin, claval suture black, veins of corium yellow, costal margin broadly black with submarginal yellow stripe; face with clypeus and clypellus fuscous, except lower lateral areas of clypeus on each side which are yellow and concolorous with lora and genae; thoracic pleura yellow, mesepisternum marked with black; legs yellow to dull brownish.

Holotype male, Archidona, Ecuador (R. Haensch) (MMB).

M. aliena, n. sp., is related to *M. paganula* (Jacobi), from which it differs in the relationship of the length of the plates to the length of the male pygofer



FIGURES 410, 411.—410, *Mesogonia tolosa* (Distant) (*a* from specimen from Yungas de Palmar, Bolivia; remainder from Cuzco, Peru): *p*, Style, connective, and paraphyses, from dorsal view. 411, *M. aliena*, n. sp., holotype (*h* from dorsal view): *p*, Male plate and dorsal sclerite, from dorsal view.

(see illustrations), its longer styles, in the form of its connective and in its much smaller size. It differs from all other species in the genus in its strong sclerite on the dorsal surface of the male plate. The connective is more strongly joined to this sclerite than to the styles.

Mesogonia emarginata, NEW SPECIES

FIGURE 413, PAGE 502

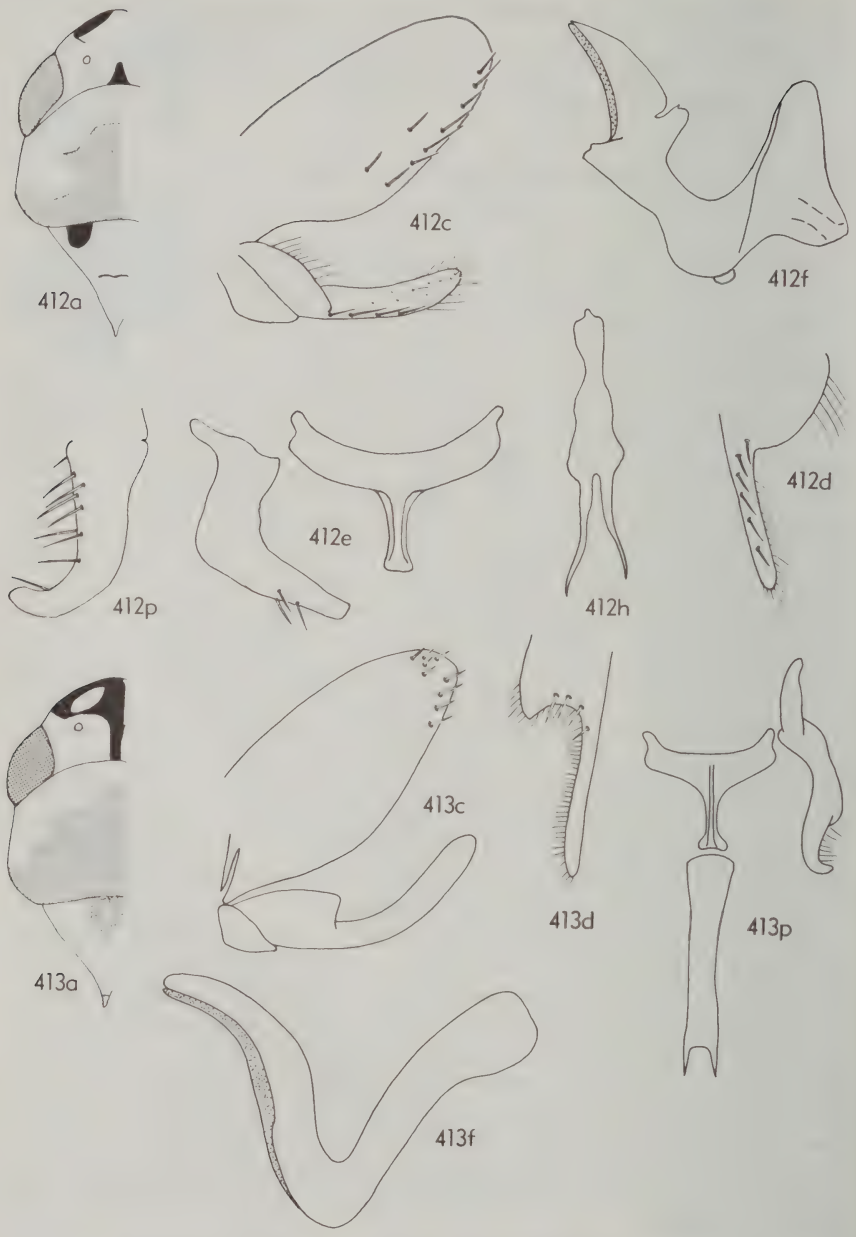
Length of male 6.9 mm. Head with median length of crown more than six-tenths interocular width and slightly less than four-tenths transocular width, anterior margin rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown with a slight median concavity before ocelli, lateral clypeal sutures extending onto crown, not attaining ocelli; antennal ledges with anterior margins oblique in lateral view; clypeus very slightly flattened medially, muscle impressions distinct; face not pubescent beneath, transclypeal suture indistinct, clypellus not tumid. Thorax with pronotal width slightly less than transocular width of head, dorsopleural carina extending anteriorly as far as eye margin, forewing translucent with veins not very distinct.

Male pygofer strongly produced, dorsoapical margin strongly convex, with very few (less than 15) anteapical macrosetae, without processes; plates not extending posteriorly as far as pygofer apex, without an anteapical dorsal lobe in lateral view, each in ventral view very abruptly tapered in basal third, with a few uniseriate macrosetae and a number of microsetae; style extending posteriorly slightly farther than apex of connective, with a slight preapical lobe, gradually narrowed to narrowly rounded apex which is curved at nearly 90° to axis of shank; connective Y-shaped with arms very widely divergent; aedeagus arched slightly ventrally, apical portion expanded on ventral margin, apex truncate, without processes; paraphyses consisting of a long stalk and two very short apical rami. Female unknown.

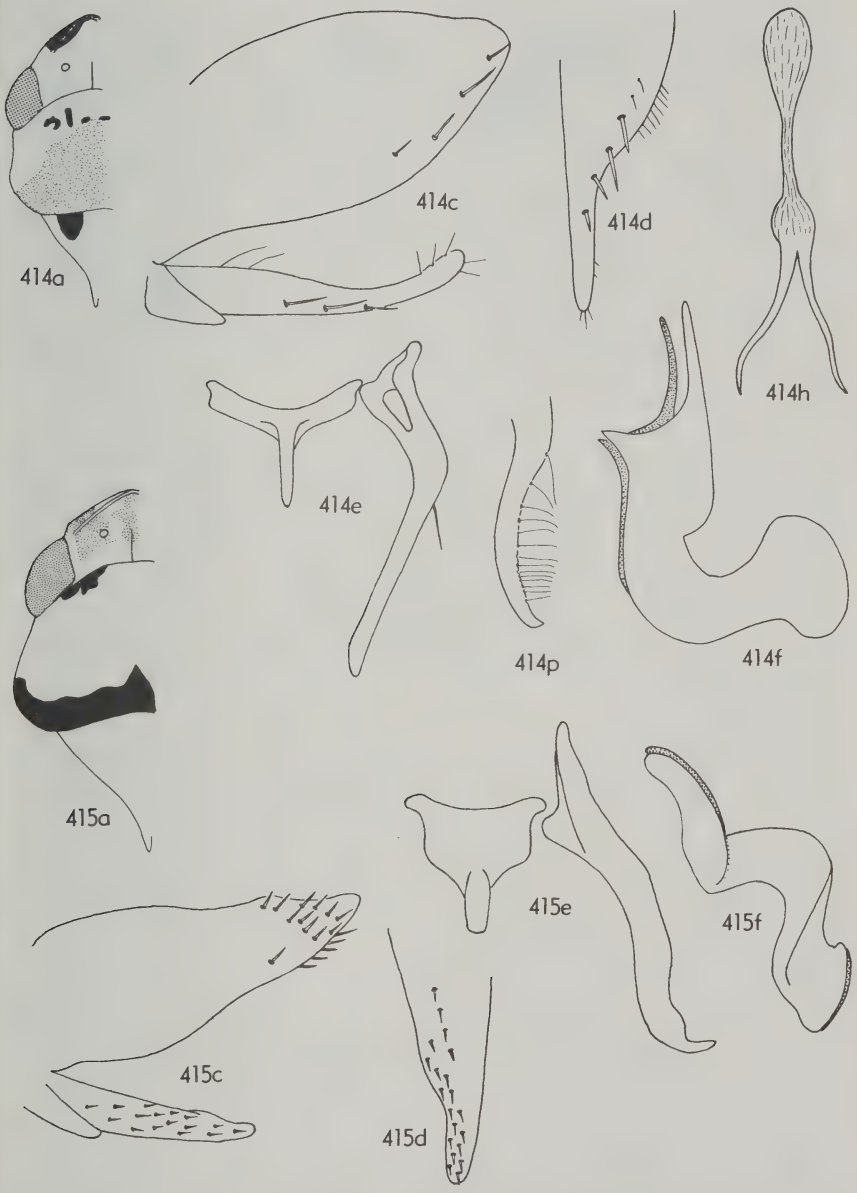
(Color of type probably affected by moisture). Crown dull yellow with median line, a pair of arcs extending, one on each side, along coronal portion of lateral clypeal suture, and anterior margin from apex to lateral clypeal suture on each side, black; pronotum with broad anterior submarginal area dull yellow tinged with castaneous, posterior two-thirds dull green; scutellum dull yellow with a broad median fuscous line; forewings sordid translucent brownish with a subcostal yellowish stripe suffused with castaneous, extending to base of outer anteapical cell; face black except a pale area next each eye on adjacent antennal ledge; thoracic pleura and legs black marked with yellow.

Holotype male, Yungas de Palmar, Bolivia, 100 m., November 1960 (A. Martinez) (SSM).

M. emarginata, n. sp., is similar to *M. paganula* (Jacobi) in that the plates are abruptly narrowed in their basal third, but this condition is more striking in *emarginata* in which the "shoulder" of the plate almost forms a separate lobe. *M. emarginata* may also be distinguished readily from *paganula* by the aedeagus which is longer and not nearly as abruptly truncate as in the Jacobi species.



FIGURES 412, 413.—412, *Mesogonia paganula* (Jacobi) (*a* from Rioja, Peru; remainder from Itaituba, Brazil; *h* from ventral view): *p*, Style apex from lateral view. 413, *M. emarginata*, n. sp., holotype: *p*, Style, connective, and paraphyses, from dorsal view.



FIGURES 414, 415.—414, *Mesogonia valida,* n. sp., holotype: ♭, Style apex from lateral view. 415, *M. callangana,* n. sp., holotype.

Mesogonia valida, NEW SPECIES

FIGURE 414, PAGE 503

Length of male 5.6-6.0 mm. Head with median length of crown from six-tenths to less than seven-tenths interocular width and from slightly more than one-third to slightly less than four-tenths transocular width, anterior margin subangulate in dorsal view, carina distinct or not at transition from crown to face, ocelli located slightly behind a line between anterior eye angles, each either equidistant from median line and adjacent anterior eye angle or slightly closer to latter, crown transversely shallowly concave between ocelli and apical margin, lateral clypeal sutures barely extending onto crown; antennal ledges with anterior margins vertical in lateral view; clypeus convex medially, muscle impressions distinct, face not pubescent beneath except for sparse very fine pubescence at clypellar apex, transclypeal suture indistinct, clypellus not tumid. Thorax with pronotal width approximately equal to transocular width of head, dorsopleural carina extending anteriorly as far as eye margin or not; forewing coriaceous with veins not distinct.

Male pygofer strongly produced, apical margin narrowly rounded, with very few macrosetae parallel to posteroventral margin, without processes, plates not extending as far posteriorly as pygofer apex, without a dorsal lobe in lateral view, each gradually tapered in basal half in ventral view, with few uniseriate macrosetae; style extending posteriorly much farther than apex of connective, without preapical lobe, gradually narrowed to acute apex and with apical portion very slightly curved; connective Y-shaped with arms widely divergent; aedeagus with shaft very short, enlarged apically, without processes; paraphyses long-stalked with slender tapering rami. Female unknown.

Crown and anterior third of pronotum dull yellow, with a large black marginal spot on each side of crown near apex; scutellum dull yellow with a basal black spot on each side near basal angle; disk of pronotum and forewings dull green, costal margin of forewing black through more than basal half its length and bordered by a submarginal contiguous yellow stripe; face yellow except clypeus which is dark with a median yellow stripe and (usually) clypellus which is suffused with fuscous (type); thoracic pleura and legs yellow, the former marked with black.

Holotype male and six additional males, Archidona, Ecuador (R. Haensch) (USNM).

M. valida, n. sp., is closely related to *M. paganula* (Jacobi) (fig. 412) from which it may be distinguished by its rounded aedeagal apex, its shorter styles in comparison to the length of the connective, and its gradually tapered male plates.

Mesogonia callangana, NEW SPECIES

FIGURE 415, PAGE 503

Length of male 7.1-7.3 mm. Head with median length of crown less than six-tenths interocular width and less than one-third transocular width, ocelli

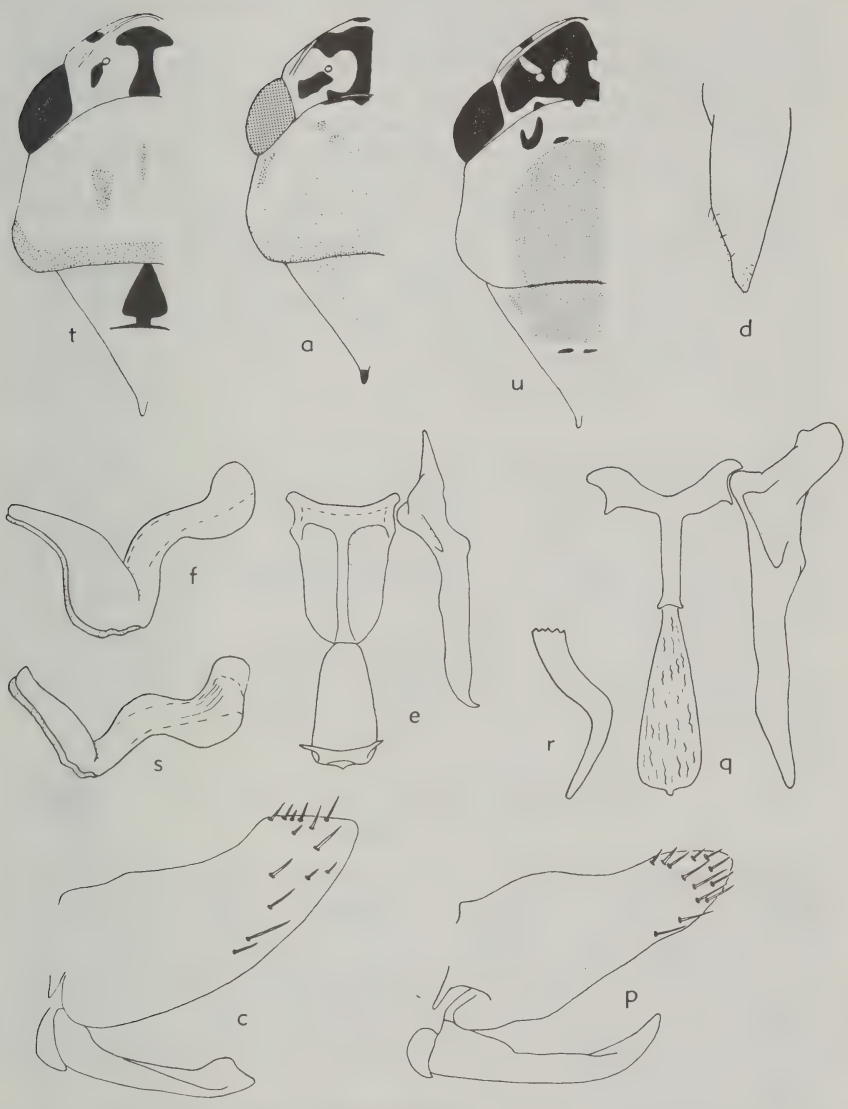


FIGURE 416.—*Mesogonia involuta* (Osborn) (*a, c-f,* from specimen from Coroico Yungas, Bolivia; *u* from Monsón Valley, Peru; remainder from Itaituba, Brazil; paraphyses included in *e*): *p,* Male pygofer and plate, from lateral view; *q,* style, connective, and membranous paraphysis, from dorsal view; *r,* style apex from lateral view; *s,* aedeagus from lateral view; *t, u,* anterior dorsum.

each equidistant from median line of crown and adjacent anterior eye angle, crown with a shallow concavity extending forward from between ocelli and broadening behind apical margin, antennal ledges with anterior margins concave in lateral view; clypeus flattened medially, muscle impressions not distinct; face slightly pubescent beneath. Thorax with dorsopleural carina extending anteriorly as far as eye margin; forewing coriaceous with veins indistinct. Other external anatomical characters as in *M. retrorsa,* n. sp.

Male pygofer strongly produced, dorsoapical margin subangularly rounded, with a few anteapical macrosetae, without processes; plates not extending as far posteriorly as pygofer apex, without a distinct dorsal lobe in lateral view, each abruptly tapered anteapically in ventral view, and with a number of small macrosetae; style extending posteriorly much farther than apex of connective, without preapical lobe, abruptly narrowed before apex which is curved at right angle to axis of shank; connective Y-shaped with arms very broad and widely divergent; aedeagus arched ventrally, thence dorsally at apex which is expanded, without processes; paraphyses absent. Female unknown.

Crown, pronotum, and scutellum orange with poorly delimited fuscous markings on midline and on each side of crown, pronotum with posterior margin broadly bordered with fuscous; forewings fuscous with bases, and areas in a number of cells, yellow to orange; clypeus deep red except area bordering dorsal carina where it is yellow and marked with an apical and two lateral black spots, genae and lora black; thoracic pleura yellow, marked with castaneous and black, legs yellow.

Holotype male and one additional male, Callanga, Peru (USNM).

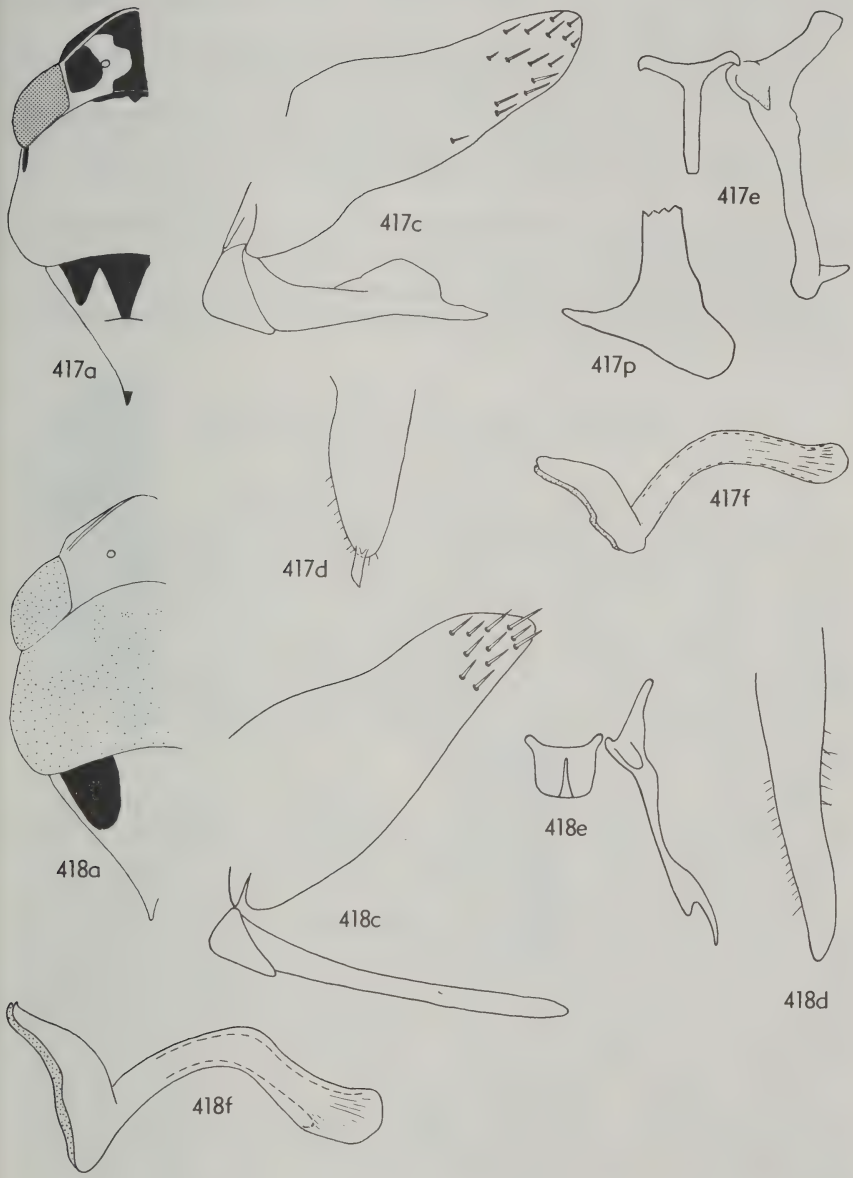
M. callangana, n. sp., is very closely related to *retrorsa,* from which it may be distinguished readily by its lack of aedeagal processes.

Mesogonia itaitubana, NEW SPECIES

FIGURE 417, PAGE 507

Length of male 7.5-7.8 mm. Head with median length of crown from slightly less to slightly more than six-tenths interocular width and from slightly less than one-third to approximately four-tenths transocular width, ocelli each slightly closer to median line than to adjacent anterior eye angle, crown with shallow concavity extending from between ocelli forward and broadening behind apical carina; face pubescent beneath. Forewing translucent with veins distinct. Other external structural characters as in *M. retrorsa,* n. sp. (p. 489).

Male pygofer slender and very strongly produced, sharply rounded at apex, with a small number of anteapical macrosetae, without processes; plates not extending as far posteriorly as pygofer apex, each with a large dorsal lobe in middle third in lateral view, each very abruptly narrowed anteapically in ventral view, the apical portion slender, parallel-sided, and obliquely truncate, without macrosetae; style extending posteriorly much farther than apex of connective, with a distinct preapical lobe, beyond which distal portion of style



FIGURES 417, 418.—417, *Mesogonia itaitubana,* n. sp., holotype: ♂, Style apex from lateral view. 418, *M. lobata,* n. sp., holotype.

is very narrow, acute, and extending at a right angle to axis of shank; connective Y-shaped with arms very widely divergent; aedeagus slender, arched ventrally, the apex curved very slightly dorsally, without processes; paraphyses absent. Female unknown.

Crown, pronotum, and scutellum dull orange, with a constricted median line and a spot bordering inner margin of each eye on crown, a median and a pair of lateral basal triangular spots on scutellum, black, the scutellar spots sometimes (type) indistinct; forewing translucent yellowish-brown; face black, clypeus pale beneath antennae; propleura yellow marked with black; legs yellow.

Holotype male and two additional males, Itaituba, Brazil (USNM). One male, "Peru" (MMB).

M. itaitubana, n. sp., is related to *M. cardinula* (Osborn), but it may be separated from the latter and from all other species in the genus by the form of the apical portion of the style.

Mesogonia monsonensis, NEW SPECIES

Figure 419, PAGE 509

Length of male 7.3-7.5 mm. Head with median length of crown less than six-tenths interocular width and slightly less than one-third transocular width, anterior margin subangulate to angular in dorsal view, ocelli located on a line between anterior eye angles and each closer to median line of crown than to adjacent anterior eye angle, crown with a shallow concavity arising between ocelli, extending anteriorly and broadening behind apical carina; clypeus slightly convex medially, muscle impressions distinct; face pubescent beneath. Thorax with dorsopleural carina extending anteriorly to eye margin. Forewings coriaceous with veins partly distinct. Other external structural characters as in *M. retrorsa,* n. sp. (p. 489).

Male pygofer well produced, dorsoapical margin subangularly rounded, with macrosetae above posteroventral margin and anteapically, pygofer without processes; plates not extending as far posteriorly as pygofer apex, each with a dorsal lobe in basal half in lateral view, in ventral view gradually tapered from base to apex, without macrosetae except on dorsal lobe; style extending posteriorly much farther than apex of connective, without preapical lobe, abruptly narrowed in basal half, the apical half narrow and crescentiform, acute at apex; connective semi-oval in shape; aedeagus in lateral view arched slightly ventrally with apex curved slightly dorsally, without processes; paraphyses absent. Female unknown.

Crown, pronotum, and scutellum black, with a trilobate yellow transverse marking on pronotum (occasionally (holotype) with median lobe obscured by black color from beneath); forewing dark gray with a small yellow spot near base, with some parts of longitudinal veins black, with a dull orange submarginal stripe along costa as far as apex of clavus; face black with few spots on clypeus, part of area between muscle impressions, apex of clypellus, loral and genal margins, yellow; propleura yellow marked with black; legs yellow.

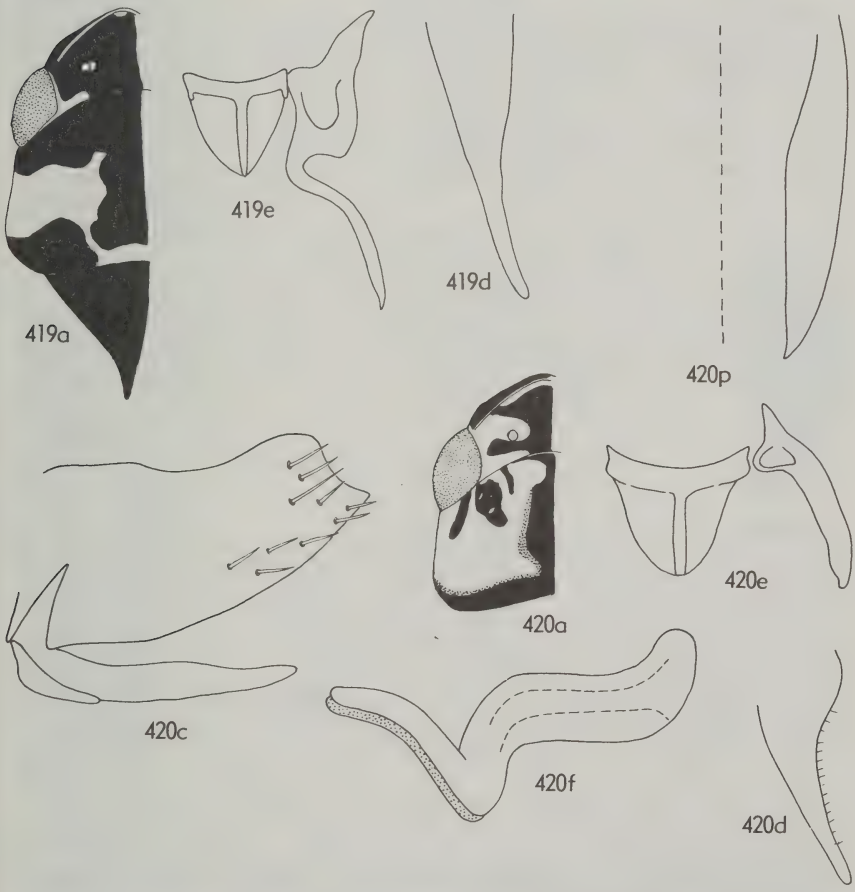
Holotype male, Monsón Valley, Tingo María, Peru, November 10, 1954 (E. I. Schlinger and E. S. Ross) (CAS). Four males, Rioja, Peru, (three in MMB, and one in USNM).

M. monsonensis, n. sp., is closely related to *M. cardinula* (Osborn) from which it may be distinguished readily by its abruptly narrowed styles.

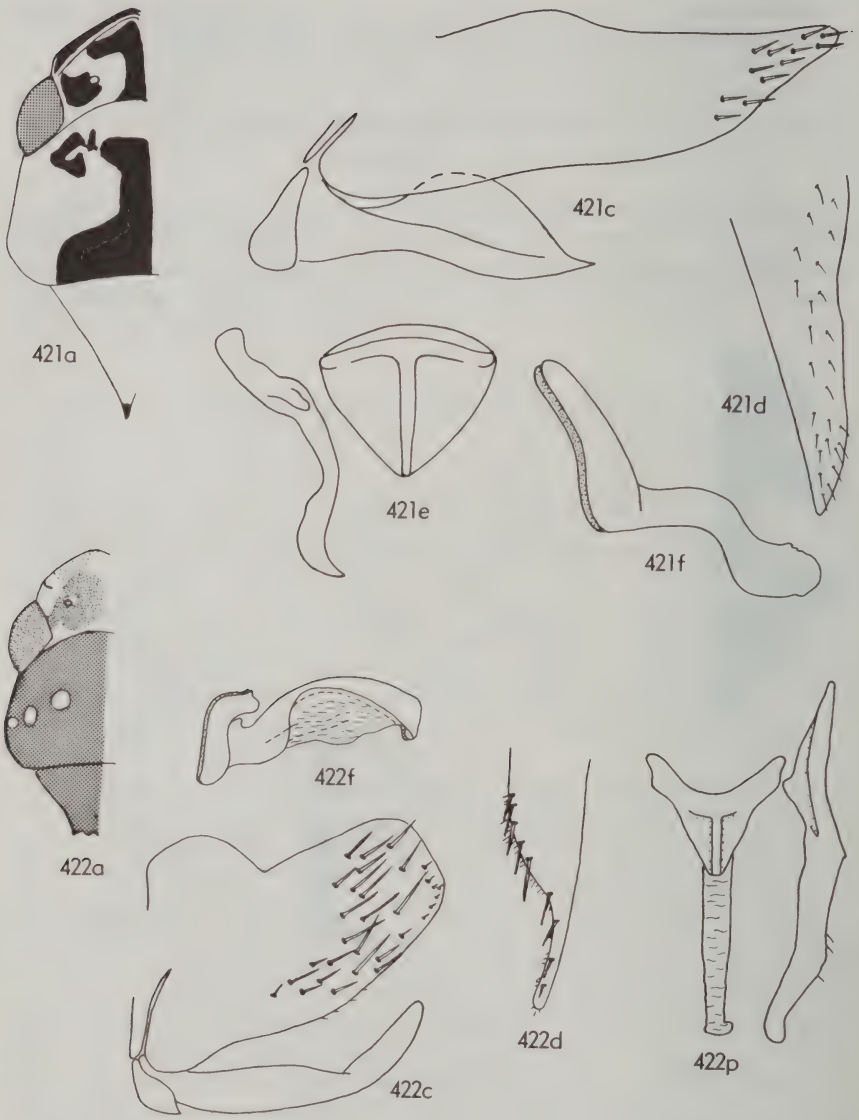
Mesogonia lobata, NEW SPECIES

FIGURE 418, PAGE 507

Length of male 8.5-8.6 mm. Head with median length of crown from slightly more than one-half to slightly less than six-tenths interocular width and slightly less than one-third transocular width, ocelli located on a line between anterior eye angles, crown with a shallow concavity arising between



FIGURES 419, 420.—419, *Mesogonia monsonensis,* n. sp., holotype. 420, *M. vexativa,* n. sp., holotype: *p,* Male pygofer, right side, from dorsal view.



FIGURES 421, 422.—421, *Mesogonia rondosa,* n. sp., holotype. 422, *M. stillatula* (Breddin), syntype (from Archidona Ecuador): *p,* Style, connective, and membranous paraphysis.

ocelli, extending forward and broadening behind apical carina; antennal ledges with anterior margins concave in lateral view; clypeus slightly flattened medially, muscle impressions distinct or not; face pubescent beneath, transclypeal suture indistinct medially. Thorax with dorsopleural carina extending anteriorly to eye margin; forewing translucent with veins not very distinct. Other external structural characters as in *M. retrorsa,* n. sp. (p. 489).

Male pygofer moderately produced, dorsoapical margin subangularly rounded, with a few anteapical macrosetae, without processes; plates extending posteriorly almost as far as pygofer apex, each without a dorsal lobe in lateral view, each in ventral view gradually tapered from base to apex, with a number of microsetae, style extending posteriorly much farther than apex of connective, with a distinct preapical lobe, apical portion acute and subparallel to axis of shank; connective subquadrate; aedeagus arched ventrally with apex gradually and slightly curved dorsally, without processes; paraphyses absent.

Crown, pronotum, and scutellum dull orange, with a pair of conspicuous black spots in basal angles of scutellum; forewing with basal halves of clavi and adjacent brachial cells pale translucent, remainder smoky translucent, each with a narrow orange stripe bordering costal margin to point opposite claval apex; face with clypeus pale (holotype) or black with pale area on each side beneath antennae, lora and genae black, clypellar apex yellow; propleura yellow marked with black.

Holotype male, Pozuzo, Peru (Schaufuss). One topotypic male with head missing, and one male with locality label "Peru" (MMB).

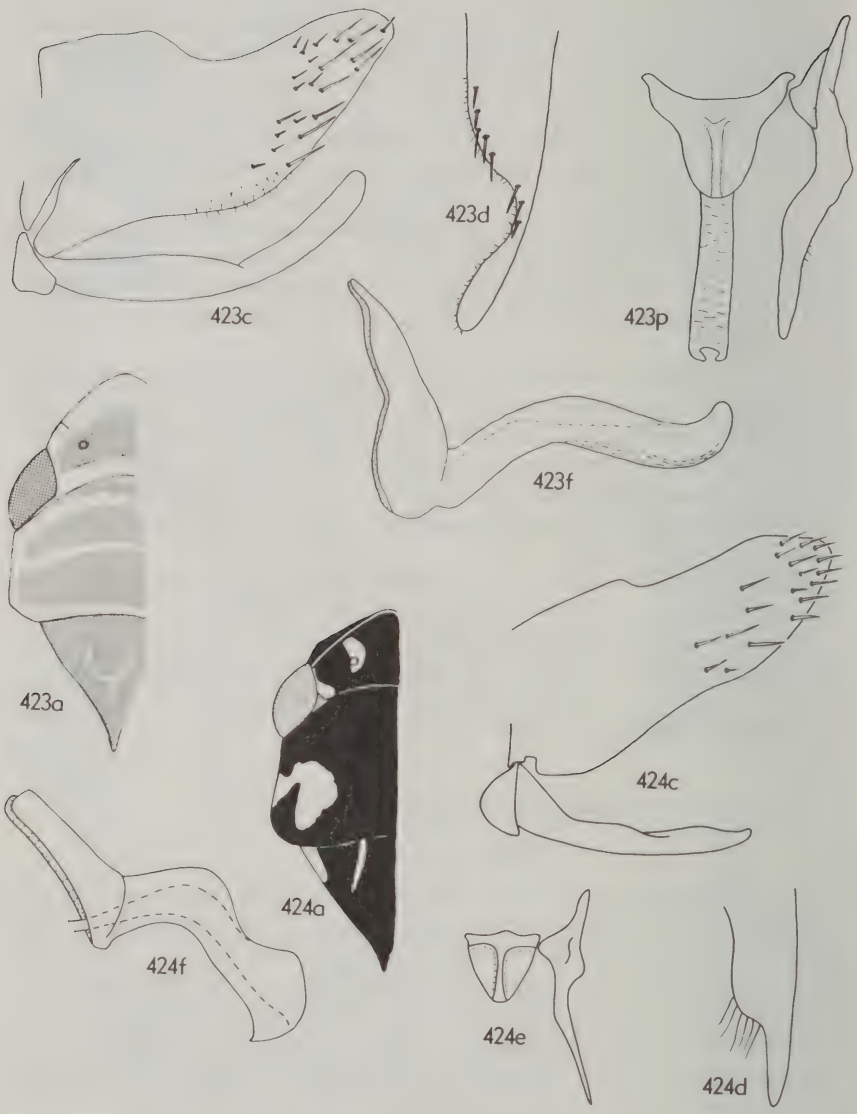
M. lobata, n. sp., appears to be closely related to *M. monsonensis,* n. sp., and *M. cardinula* (Osborn), from both of which it may be distinguished readily by its lack of a dorsal lobe on the male plate in lateral view, and the presence of the anteapical lobe of the style.

Mesogonia vexativa, NEW SPECIES

FIGURE 420, PAGE 509

Length of male 7.4 mm. Head with median length of crown from one-half to slightly less than six-tenths interocular width and approximately one-third transocular width, ocelli located slightly behind a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, crown with a broad concavity between ocelli and anterior carina; antennal ledges with anterior margins concave in lateral view; clypeal muscle impressions distinct; face pubescent beneath. Forewing translucent (holotype) or coriaceous, veins distinct. Other external structural characters as in *M. retrorsa,* n. sp. (p. 489).

Male pygofer moderately produced, dorsal margin with an anteapical convex lobe, dorsoapical margin angular, with a few anteapical macrosetae, without processes; plates not extending as far posteriorly as pygofer apex, without a dorsal lobe in lateral view, each in ventral view abruptly tapered near base, with a number of short microsetae; style extending posteriorly



FIGURES 423, 424.—423, *Mesogonia atramentatula* (Breddin) (*a* from specimen from Monsón Valley, Peru; remainder from Pozuzo, Peru): *p*, Style, connective, and membranous paraphysis. 424, *M. pruriginosula* (Jacobi) (*a* from specimen from "Toungas de la Paz", Bolivia; remainder from Peru).

approximately as far as apex of connective, without preapical lobe, somewhat irregularly narrowed at apex; connective semi-oval with a Y-shaped differentially sclerotized portion; aedeagus arched slightly ventrally, the apex curved slightly dorsally; without processes; paraphyses absent. Female unknown.

Crown and pronotum bright yellow, a median black stripe on crown expanded laterally at basal and apical margins; an irregular median longitudinal marking on pronotum, expanded posteriorly to extend along posterior pronotal margin, and a few spots along anterior margin, black; (color of scutellum obscured by pins); forewing with costal, humeral, and commissural margins broadly bordered with dark, varying from a pattern where the only additional color marking is a greenish area in base of clavus (type), to a pattern with greenish area extending from base to apex of clavus and with thin longitudinal green stripe on midcorium which is dark brown; face and thoracic pleura black; legs black basally, paler apically.

Holotype male and one additional male, Coroico, Bolivia (MMB).

M. vexativa, n. sp., appears to be related to *M. cardinula* (Osborn) from which it differs in its dorsal lobe of the pygofer margin, its lack of a dorsal lobe on the male plates, and its shorter styles.

Mesogonia rondosa, NEW SPECIES

FIGURE 421, PAGE 510

Length of male 7.8-8.0 mm. Head with median length of crown from six-tenths to slightly less than seven-tenths interocular width and from slightly more than one-third (type) to four-tenths transocular width, ocelli located on or slightly before a line between anterior eye angles, each equidistant from anterior eye angle and median line of crown or slightly closer to latter, with a shallow concavity arising between ocelli, extending forward and broadening behind anterior carina; clypeus with muscle impressions distinct, face pubescent beneath. Forewing with membrane including all of anteapical and apical cells and apical portion of clavus and brachial cells, veins distinct. Other external structural characters as in *M. retrorsa,* n. sp. (p. 489).

Male pygofer very strongly produced, dorsoapical margin subangularly rounded, with a few anteapical macrosetae, without processes; plates not extending posteriorly nearly as far as pygofer apex, each with a very broad strongly convex dorsal lobe extending almost throughout length of plate in lateral view, each plate in ventral view gradually tapered from base to apex and with numerous microsetae; style extending posteriorly much farther than apex of connective, without preapical lobe, apex acute and slightly curved; connective subtriangular, with a T-shaped differentially sclerotized portion; aedeagus in lateral view with apical half curved ventrally, then slightly posterodorsally, without processes; paraphyses absent. Female unknown.

Crown and pronotum tan, crown with a median mushroom-shaped marking, and a marking extending laterally from each ocellus, black; pronotum with middle portion, from disk to posterior margin, marked with green of varying extent, with a pair of irregular black markings behind inner margin of

each eye; forewing with coriaceous portion gray, a broad subcostal amber stripe extending from wing base to base of outer anteapical cell; clypeus and clypellus black, remainder of face tan; thoracic pleura tan marked with black; legs yellow.

Holotype male, November 26, 1954, and three additional males, November 10 and 29, 1954, Monsón Valley, Tingo María, Peru, all collected by E. I. Schlinger and E. S. Ross (CAS).

M. rondosa, n. sp., can be readily separated from all other species of the genus by the convex dorsal margin of the male plate, in lateral view. (fig. 421*c*).

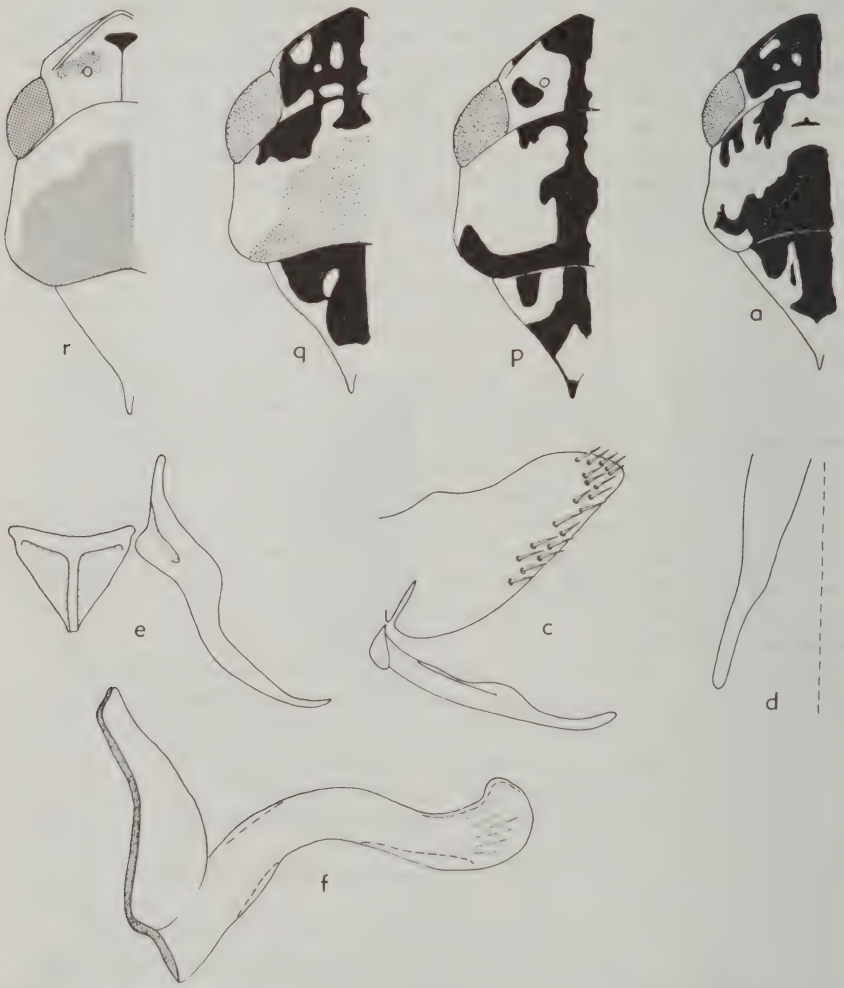


FIGURE 425.—*Mesogonia cardinula* (Osborn) (*e*, *f*, *p*, *q*, from specimens from Cocoico Yungas, Bolivia; *r* from Monsón Valley, Peru; remainder from Yungas de Palmar, Bolivia): *p-r*, Anterior dorsum.

Mesogonia vinnula, NEW SPECIES

FIGURE 426

Length of male 6.0-6.5 mm, of female 6.0 mm. Head with median length of crown from three-fourths to more than eight-tenths interocular width and from four-tenths to approximately one-half transocular width, without a distinct carina at transition from crown to face, ocelli located slightly behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown shallowly concave before ocelli, lateral

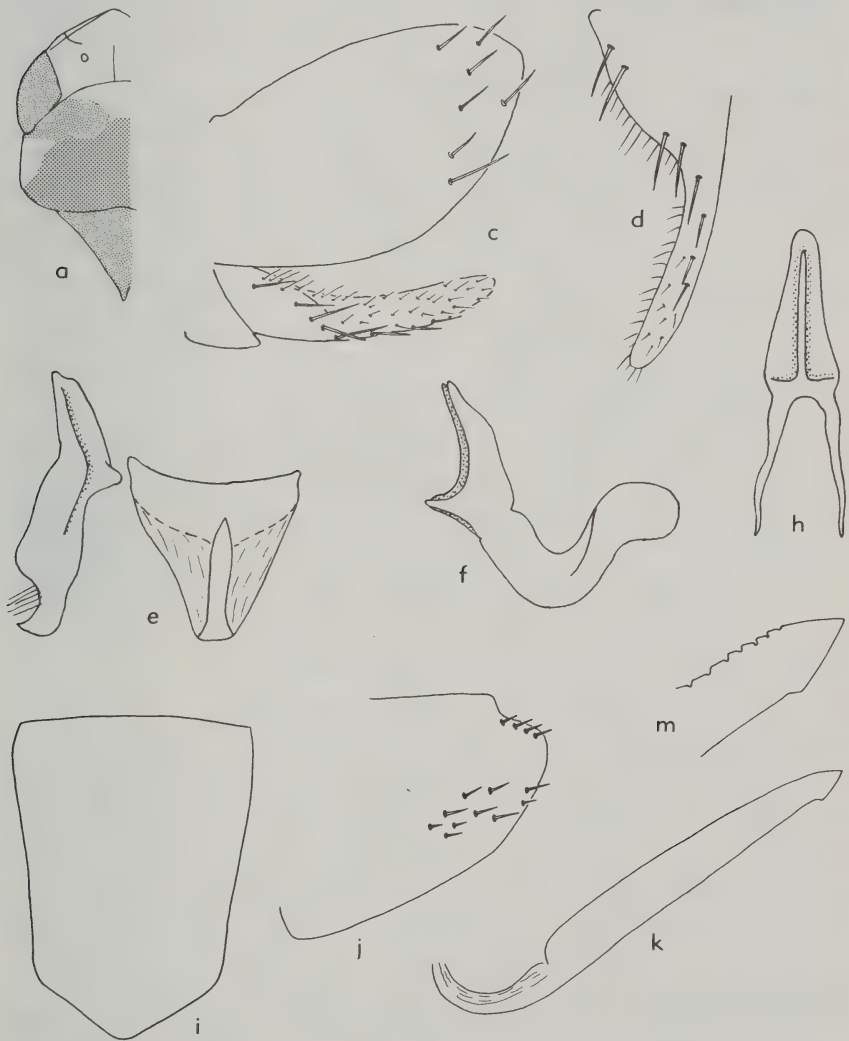
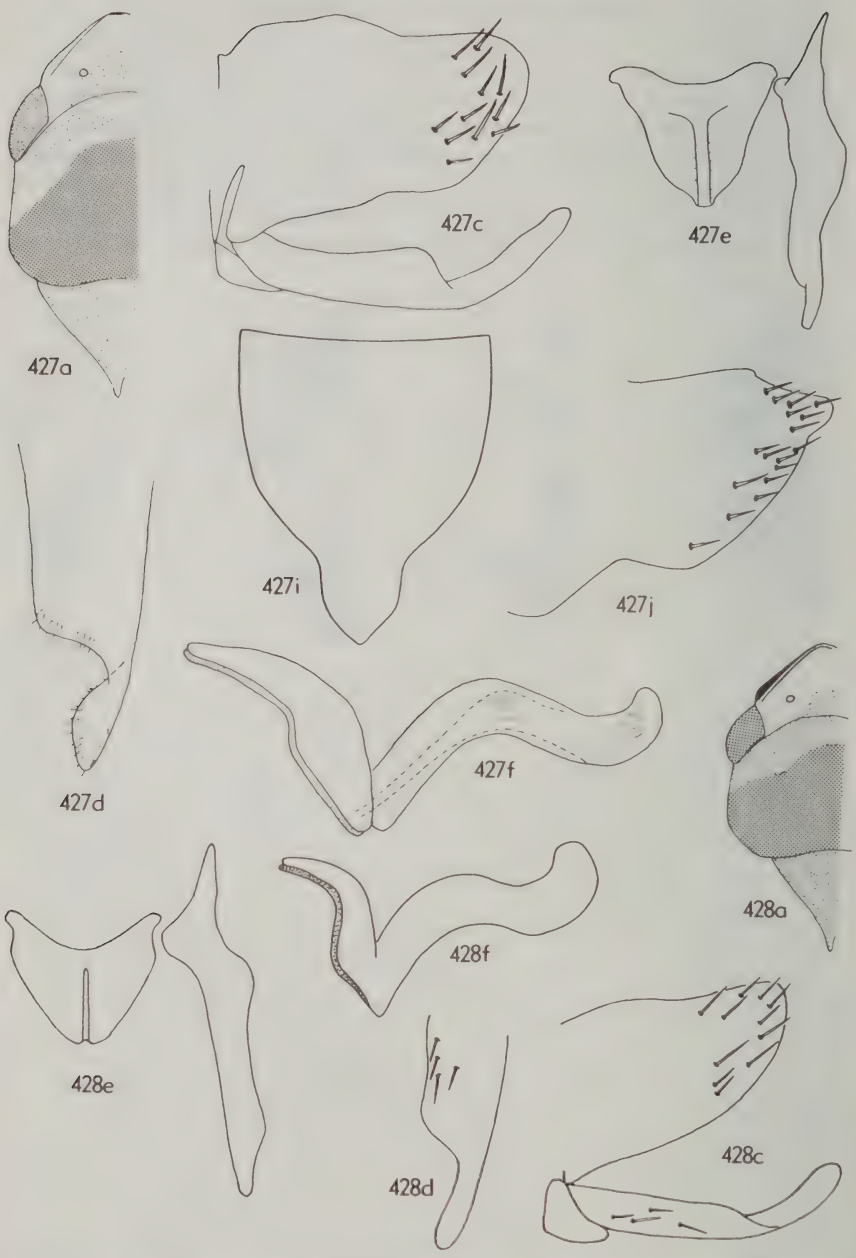


FIGURE 426.—*Mesogonia vinnula*, n. sp. (*i-k, m*, from topotype; remainder from holotype; *h* from ventral view).



FIGURES 427, 428.—427, *Mesogonia olivatula* (Osborn) (*a* from specimen from Monsón Valley, Peru; *i, j,* from Mapiri, Bolivia; remainder from Archidona, Ecuador). 428, *M. ludicula* (Osborn) (from specimen from Archidona, Ecuador).

clypeal sutures extending onto crown, not attaining ocelli; antennal ledges with anterior margins vertical in lateral view, carinate dorsally or not, clypeus slightly convex or slightly flattened medially, muscle impressions distinct or not; face not pubescent beneath, transclypeal suture indistinct, clypellus not tumid. Thorax with pronotal width equal to or greater than transocular width of head, dorsopleural carina extending anteriorly as far as eye margin, forewing coriaceous with veins distinct or not.

Male pygofer moderately produced, apical margin abruptly rounded, with few sparse anteapical macrosetae, without processes; plates not extending as far posteriorly as pygofer apex, without dorsal lobe in lateral view, each in ventral view abruptly tapered in basal half, with uniseriate macrosetae and a number of microsetae; style extending posteriorly approximately as far as apex of connective, with distinct preapical lobe and with apex subtruncate; connective subtriangular with a Y-shaped heavily sclerotized portion; aedeagus arched dorsally except apex which is curved slightly posteroventrally, without processes; paraphyses with stalk approximately as long as rami. Female abdominal sternum VII with posterior margin slightly produced and rounded medially (see also generic description).

Crown pale to dull yellow, usually unmarked, anterior pronotal margin bordered with chocolate brown (type) to buff, remainder of pronotum bright (type) to sordid green; scutellum brown to buff; forewing bright (type) to sordid green, in type marked with brown in midclavus and in wing bases and anteapically; color of face variable, clypeus usually yellow marked with a pair of darker stripes and bordered broadly with black laterally and ventrally, the black including all of clypellus; thoracic pleura and legs, yellow.

Holotype male and one female, "Porto Platon", Terr. Amapá, Brazil, September 18, 1957 (John Lane) (in Lane collection). Two males, Archidona, Ecuador (USNM). Two additional males, Archidona, Ecuador (MMB).

Externally, *M. vinnula*, n. sp., is similar in appearance to *M. olivatula* (Osborn) but it differs in the shape of the male plates and in the length of styles.

Mesogonia suspecta, NEW SPECIES

Length of male 6.6-7.5 mm. Head with median length of crown from slightly less to slightly more than one-half interocular width and approximately one-third transocular width, ocelli located behind a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, crown concave before ocelli and behind anterior carina; antennal ledges with anterior margins concave in lateral view; clypeus with muscle impressions distinct; face sparsely pubescent beneath, transclypeal suture distinct or not. Thorax with pronotal width approximately equal to transocular width of head, dorsopleural carina extending anteriorly to eye margin; forewing coriaceous with veins not very distinct. Other external structural characters as in *M. retrorsa* (p. 489).

Male pygofer not strongly produced, dorsoapical margin convex, with a few anteapical discal macrosetae, without processes; plates extending as far as or

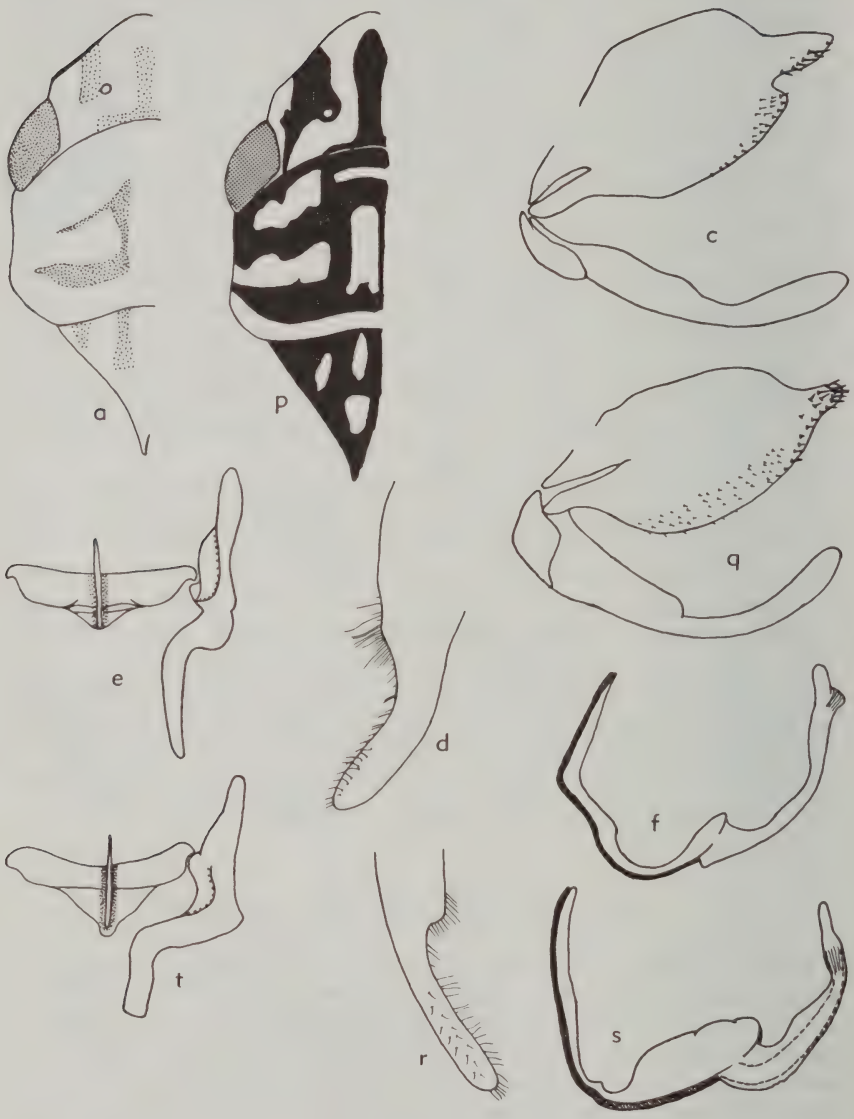


FIGURE 429.—*Mesogonia evansi*, n. sp. (*a*, *c-f*, from specimen from Peru; remainder from Bolivia): *p*, Anterior dorsum; *q*, male pygofer and plate, from lateral view; *r*, plate from ventral view; *s* aedeagus from lateral view; *t*, style and connective, from dorsal view.

farther posteriorly than pygofer apex, without a dorsal lobe in lateral view, each in ventral view abruptly tapered in basal portion of apical third, each with a group of multiseriate small macrosetae; style extending posteriorly much farther than apex of connective, without preapical lobe, apical portion gradually and slightly tapered and curved, acute at tip; connective semi-ovate, with a median keel; aedeagus arched ventrally through most of its length, apex curved dorsally, without processes; paraphyses absent. Female unknown.

Crown and anterior marginal area of pronotum greenish-yellow to dull yellow, with a median basal spot on crown and a spot on marginal area of pronotum on each side behind eye, dull orange to brick red, remainder of pronotum pale green variably suffused with darker green medially; scutellum dull orange; forewings dark green with a portion of brachial cell, narrow arch across bases of anteapical cells and often with a small transcomissural claval spot, orange-red, costa bordered with pale green to bases of anteapical cells; face with more than dorsal two-thirds of clypeus yellow, with a small black spot beneath apex of crown, remainder variously marked with black; thoracic pleura and legs yellow, often marked with black.

Holotype male, Monsón Valley, Tingo María, Peru, November 10, 1954 (E. I. Schlinger and E. S. Ross) and a long series of topotypic males collected in October, November, and December (CAS). Two males, Paucartambo, Peru (ZIL). Six males, Yungas de Palmar, Bolivia, 100 m., November, 1960 (SSM). Five males, Rioja, Peru (MMB).

M. suspecta, n. sp., is closely related to *M. ludicula* (Osborn). The male genitalia (fig. 428) are identical in the two species. The color markings are similar except that the face of specimens of *ludicula* is entirely black, and that the transcommissural claval spot, present in most specimens of *suspecta,* is absent in those specimens of *ludicula* which I have studied. *M. suspecta* is considerably larger than *M. ludicula* which is only slightly longer than 6.0 mm. No specimens of *M. brevisula* (Osborn) have been seen and there is a possibility that *M. suscepta* will be preempted by the last.

Mesogonia evansi, NEW SPECIES

FIGURE 429

Length of male 8.0-8.3 mm, of female 7.7 mm. Head with median length of crown from six-tenths to more than three-fourths interocular width and from slightly more than one-third to more than four-tenths transocular width, anterior margin rounded in dorsal view, with a distinct carina at transition from crown to face, ocelli located before a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, crown shallowly concave behind apex, lateral clypeal sutures not extending onto crown; antennal ledges with anterior margins vertical in lateral view, carinate dorsally; clypeus concave dorsally at least, muscle impressions distinct, clypellus slightly pubescent apically, transclypeal suture indistinct, clypellus not tumid. Thorax with pronotum not wider than head, dorsopleural carina not extending anteriorly as far as eye margin, forewing with anteapical and apical cells membranous, veins distinct, femoral setal formula 2:0:0.

Male pygofer with dorsoapical portion produced in a short convex lobe bearing few macrosetae, with numerous microsetae in a group parallel to posteroventral margin. Plates extending posteriorly as far as apex of pygofer, each tapered near midlength, each bearing numerous microsetae in apical two-thirds. Style extending posteriorly beyond apex of connective, bisinuate, without preapical lobe, apex rounded. Connective transverse, broadly triangular. Aedeagus with shaft curved dorsad, without processes. Paraphyses absent.

Female genitalia much as in illustration of specimen of *Mesogonia* sp. from Baños, Ecuador (fig. 430), but with dorsal teeth of second valvulae more nearly quadrate.

Typical variety with ground color of crown, pronotum, and scutellum dull yellow, crown with a median stripe extending from posterior margin almost to apex and a shorter parallel stripe on each side extending from ocellus to anterior margin, pale brown to black, the lateral markings reduced in some specimens to a black spot surrounding each ocellus; pronotum with a short longitudinal stripe on disk on each side of median line with a lateral extension from each extremity, pale brown to black, the anterior extension lacking in some specimens; scutellum with an angular mark in each basal angle and a pair of parallel longitudinal stripes in basal half, pale brown to black; forewing brown to black to bases of anteapical cells, with some longitudinal veins and occasionally additional broader diagonal areas in basal portion of clavus paler; face, thoracic pleura, and legs, yellow, except a black spot on upper

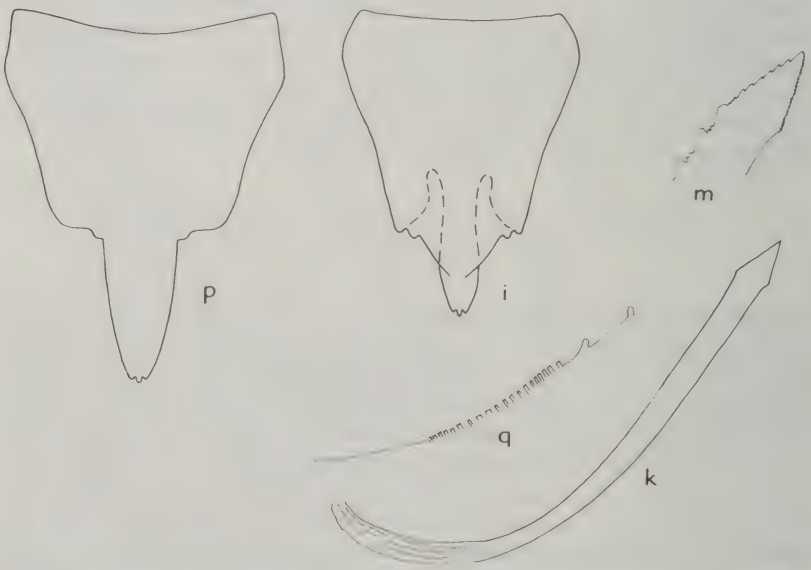


FIGURE 430.—*Mesogonia* sp. (specimens from Baños, Ecuador): *p*, Female abdominal sternum VII from ventral view; *q*, teeth at base of toothed portion of dorsal margin of second valvula.

portion of proepimeron bordering posterior eye margin and a black area at anterior margin of mesepisternum. Darker variety with horizontal black markings of pronotum more extensive and with anterior pronotal margin bordered with black; scutellum mostly black with two median spots and one lateral spot on each side, pale.

Holotype and eight additional males, Tingo María, Peru, October 16, 670 m. (W. Weyrauch), "WKW 312"; one female, Mojinga Swamp, Panama, November 27, 1951 (F. S. Blanton) (USNM). Five males, Monsón Valley, Tingo María, Peru, December 9, 1954 (E. I. Schlinger and E. S. Ross) (CAS). Three males, C. Esperanza, Beni, Bolivia, Mulford Biological Expedition, 1921-1922 (W. M. Mann) (USNM). One male, Yungas de Palmar, Bolivia, 100 m., November, 1960 (A. Martínez) (SSM). Two males, Rioja, Peru (ZIL). The specimens from Bolivia and Rioja, Peru are of the darker variety.

Mesogonia evansi, n. sp., is readily separated from other species of the genus by its 2:0:0 hind femoral setal pattern. I believe the Panama specimen is accurately labeled. It may have been adventive. This is the species that would have been the type-species of *Santarema* Melichar had it been described. A specimen in Budapest, labeled "*Santarema acocephala* M" and a "typus" label in HNHM belongs here. To avoid future confusion, it should be noted that a pin, in MMB, bears an entire specimen of *Tlagonalia nigroguttata* (Signoret) and a part of a male specimen of *Mesogonia evansi,* n. sp. The pin also bears a label: "Yurimaguas". *M. evansi* would fit Melichar's (1926a:344) key; *T. nigroguttata* would not.

67. ROTIGONALIA, NEW GENUS

FIGURES 431, 432

Type-species: *Cyclogonia rudicula* var. *concedula* Melichar.

Length 5.9-7.1 mm.

Head only slightly produced and with anterior and posterior margins almost parallel, median length of crown from one-third to slightly more than one-half interocular width and from one-fifth to slightly more than one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, crown without a transverse concavity before ocelli, surface without sculpturing, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical to oblique and convex; clypeus flattened or convex medially, muscle impressions distinct or not, face without pubescence, transclypeal suture interrupted medially, clypellus continuing contour of face or with its lower portion more nearly horizontal, its laterobasal portion swollen (*R. concedula* (Melichar)) or not.

Thorax with pronotal width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin varying from slightly convex to slightly concave, disk

without sculpturing; scutellum not striate behind transverse sulcus. Forewing with membrane including all or only basal portion of apical cells, veins elevated, distinct, with three closed anteapical cells all of which have their bases proximal to claval apex, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female at rest exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly, posterodorsal margin narrowly rounded, macrosetae numerous, occurring on posterior half. Plates triangular, not extending posteriorly nearly as far as pygofer apex, with macrosetae mostly uniseriate. Style not extending nearly as far posteriorly as apex of connective, strongly curved anteapically, truncate or not at apex. Connective elongate Y-shaped, the median portion longer than the arms. Aedeagus short, arched slightly, with apex directed slightly posteroventrally, without processes. Paraphyses broad at base with paired symmetrical rami.

Female (*concedula* not studied) abdominal sternum VII with posterior margin produced and bluntly angulate. Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvula bearing dorsal teeth from a point behind basal curvature to apex of valvula, the teeth triangular through most of length, becoming subquadrate and more closely spaced near apex, secondaries extremely minute; anteapical denticles present dorsally; apex acute, ventral margin very weakly convex. Pygofer with a number of macrosetae on posterior half.

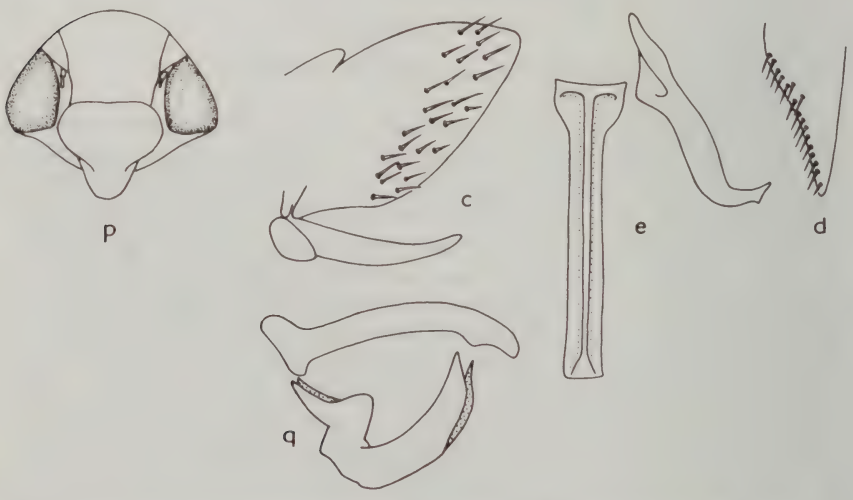


FIGURE 431.—*Rotigonalia concedula* (Melichar) (*p* from specimen from Tingo María, Peru; remainder from lectotype): *p*, Face from anteroventral view; *q*, aedeagus and paraphyses, from lateral view.

Color green marked with orange to a varying (interspecifically) degree. *R. limbatula* (Osborn) is beautifully marked with orange anteriorly and laterally on both crown and pronotum, on costal and commissural margins of the forewings, and the scutellum is orange.

The range of *Rotigonalia,* new genus, is Costa Rica, French Guiana, Peru, Bolivia, and Brazil. The genus is probably related to *Juliaca* Melichar, but it

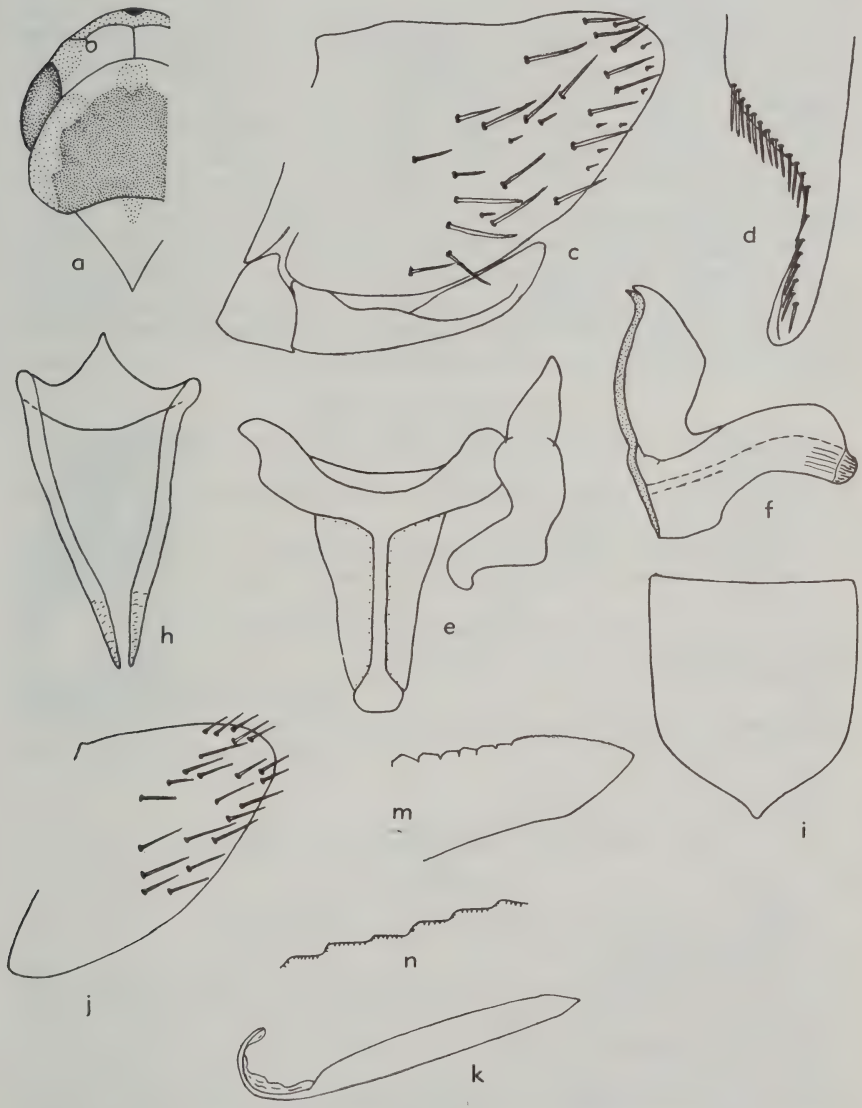


FIGURE 432.—*Rotigonalia limbatula* (Osborn) (*i-k, m, n,* from specimen from French Guiana; remainder from Archidona, Ecuador).

differs from the latter and from most other genera in the more strongly convex anterior pronotal margin, the pronotum appearing inserted into the head, in dorsal view. It differs from *Juliaca* in the long connective of the male; the structure does not extend posteriorly as far as the style apex in *Juliaca*. *Rotigonalia* is also close to *Plerogonalia,* new genus, as indicated in the description of the latter.

I have studied the male lectotype of *Cyclogonia rudicula* var. *concedula* Melichar (fig. 431).

There is confusion relating to the epithet *limbatula*. I have seen a specimen labeled "limbatula Guérin det. Breddin." No such Guérin name was catalogued by Metcalf. Osborn's (1926b: 211) treatment of *Cicadella limbatula* (Germar) is probably either a *lapsus calami* or a misreading of "Guérin" on that label. Melichar (1926a: 349) realized that *limbatula* had not been published, and treated it as a new species. Osborn's action constitutes a description of a new species under the International Rules, and *limbatula* Osborn competes with *limbatula* Melichar, both 1926, the junior name to be both a subjective synonym and a secondary homonym. The Osborn name, published on March 11, 1926 was prior to the Melichar name. In addition to the specimen (without abdomen) with the Guérin manuscript name, I have also studied the lectotype of *limbatula* Melichar.

SPECIES OF *ROTIGONALIA*

concedula (Melichar), 1926a:349 (*Cyclogonia rudicula* var.). New combination. Peru, Bolivia.

limbatula (Osborn), 1926b:211 (*Cicadella*). Costa Rica, Fr. Guiana, Ecuador, S. Brazil. New combination.

limbatula (Distant), 1908a:531 (*Tettigonia*). *Nomen nudum.*

limbatula (Melichar), 1926a:349 (*Cyclogonia*). New synonymy.

KEY TO SPECIES OF *ROTIGONALIA*

Clypellus inflated at its base (Peru, Ecuador)
concedula (Melichar) (fig. 431)

Clypellus not inflated (Costa Rica, Ecuador, Fr. Guiana, S. Brazil)
limbatula (Osborn) (fig. 432)

68. GEITOGONALIA, NEW GENUS

FIGURE 433

Type-species: *Tettigonia quatuordecimmaculata* Taschenberg.

Length of male 8.1 mm.

Head moderately produced, its median length two-thirds interocular width and slightly more than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located slightly behind a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, surface with a shallow concavity before ocelli, lateral clypeal sutures extending onto

crown and attaining ocelli; antennal ledges each with anterior margin oblique and slightly convex in lateral view; face slightly flattened medially, muscle impressions not very distinct, transclypeal suture interrupted medially.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, hind margin shallowly concave, disk without sculpturing or pubescence; scutellum without transverse rugae behind transverse depression. Forewing with apical portion darkly membranous but with membrane not sharply delimited at its base, veins not very distinct, with four apical cells of which base of fourth is almost opposite base of third, texture of portion before membrane coriaceous, without sculpturing; female with forewings in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length greater than combined length of second and third tarsomeres, with two longitudinal rows of minute setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterodorsal margin narrowly convex, without lobes or processes, with a number of macrosetae on posterior half. Plates separate throughout their length, narrowly triangular, with uniseriate macrosetae. Style not extending posteriorly as far as apex of connective, with anteapical lobe, apex truncate. Connective T-shaped. Aedeagus short, directed posterodorsally, its ventral margin concave, apex

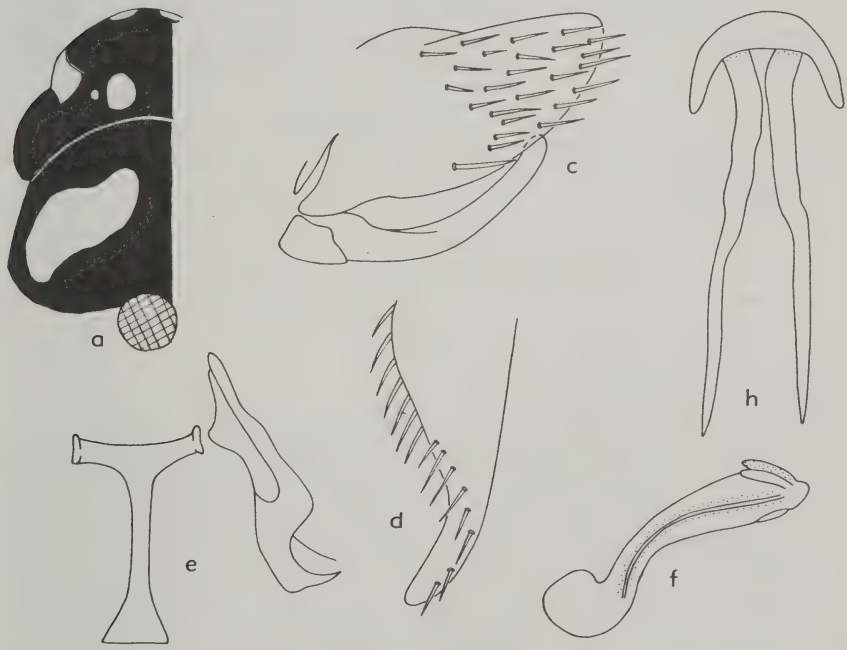


FIGURE 433.—*Geitogonalia quatuordecimmaculata* (Taschenberg) (*a* from lectotype; remainder from lectotype of *Cardioscarta seguyi* Melichar; *h* from dorsal view).

with a pair of short processes extending basally near dorsal margin in lateral view. Paraphyses consisting of a transverse basal portion and slender, elongate rami.

Female abdominal sternum VII moderately produced with posterior margin transverse with a slight angularity at middle. Ovipositor with second valvula broadened in most of portion beyond basal curvature, with sloping quadrate primary teeth becoming progressively smaller towards apex, each with minute secondaries, apex acute with anteapical dorsal and ventral denticles. Pygofer with macrosetae numerous, occurring on most of surface.

The female structures are not illustrated. The sternum VII is much as in the illustration of *Tettigonia concinna* Perty (fig. 890*i*) but slightly longer. The second valvulae are much as in the illustration of *Ramosulus corrugipennis* (Osborn), but not as broad. The pygofer is like the illustration of the latter (fig. 358*j*).

I have seen only four specimens of the type-species, three labeled "Brazil" and one from the state of Rio de Janeiro. It is a dark species marked with bright orange on the crown and forewings. I have placed it near *Juliaca* Melichar, but none of the species of *Juliaca* have aedeagal processes except *J. peragilis* (Melichar) and they are not apical in that species.

I have seen two females of the type-species from the Taschenberg collection in Martin Luther University, Halle an der Salle. One specimen was without the head. I select the other specimen as lectotype. It bears no label, but an accompanying label states: "quatuorde/cim-macula/ta m.". I have also studied the lectotype (fig. 433) of *Cardioscarta seguyi* Melichar.

SPECIES OF *GEITOGONALIA*

quatuordecimmaculata (Taschenberg), 1884a:447 (*Tettigonia*). S. Brazil. New combination.

seguyi Melichar, 1932a:297 (*Cardioscarta*). New synonymy.

69. PLEROGONALIA, NEW GENUS

FIGURE 434

Type-species: *Tettigoniella rudicula* Jacobi.

Length of male 7.1-8.0 mm.

Head very slightly produced, anterior and posterior margins parallel, median length of crown slightly more than one-third interocular width, and approximately one-fifth transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, crown convex, without a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins almost vertical and slightly convex, muscle impressions not distinct, face without pubescence, transclypeal suture entire, clypellus not strongly produced, its profile continuing contour of clypeus.

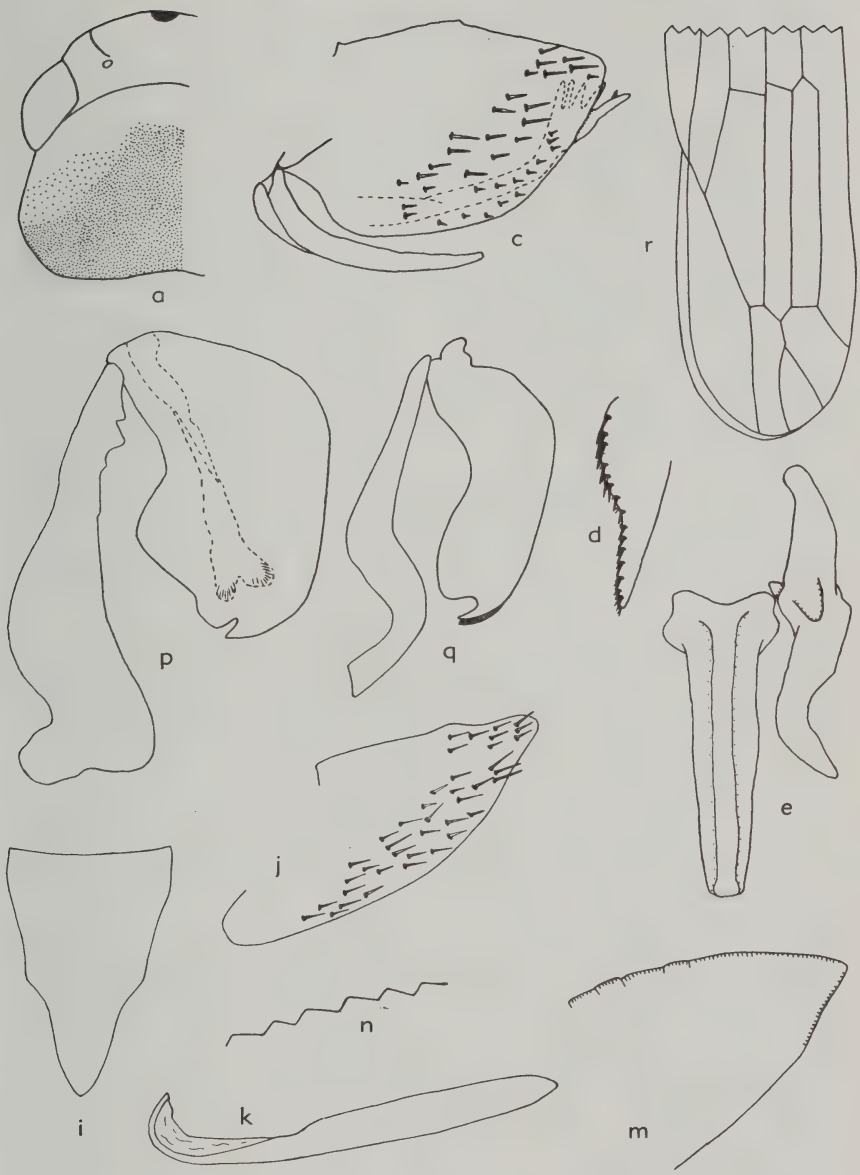


FIGURE 434.—*Plerogonalia rudicula* (Jacobi) (*i-k, m, n,* from specimen from Baños, Ecuador; *q* from Peru; remainder from Bolivia; secondary denticles not shown in *n*): *p, q,* Paraphysis and aedeagus, from lateral view; *r,* apical portion of forewing.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin very slightly concave, disk not or only obscurely rugulose, not pubescent; scutellum not striate behind transverse sulcus. Forewing with membrane including all of apical cells except base of third, and extending forward along costal margin to bases of anteapical cells, veins dark, distinct, with three anteapical cells all of which are closed basally, with four apical cells of which third is petiolate and base of fourth is located more proximally than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin convex, macrosetae variable in size, irregularly spaced, extending in a broad multiseriate group parallel to posteroventral margin to dorsal margin, pygofer process as in *Scopogonalia,* new genus (see below). Plates short, narrowly triangular, not extending nearly as far posteriorly as pygofer apex. Style not extending posteriorly nearly as far as apex of connective, without a preapical lobe. Connective a longitudinal bar, widened at base. Aedeagus broad, directed ventrad, with a pair of very short apical processes. Paraphysis unpaired, articulated both with apex of connective and with base of aedeagus, without processes.

Female abdominal sternum VII strongly produced and acute apically. Ovipositor with second valvulae toothed on apical three-fourths behind basal curvature, the teeth slanting except near apex, and bearing minute secondary denticles, anteapical dorsal and ventral denticles present. Pygofer strongly produced and with numerous macrosetae in an irregular group parallel to posteroventral margin.

Plerogonalia, new genus, is known only from the type-species which has the forewings and the posterior portion of the pronotum deep green, the anterior portion of the pronotum and the scutellum buff, and the crown yellowish brown with an apical spot.

Plerogonalia is known only from Peru and Bolivia. It is close to *Scopogonalia,* from which it differs in the larger size of its specimens, its unpaired paraphysis, and in the anteapical cells which are closed basally. *Plerogonalia* is also closely related to *Rotigonalia,* new genus, in both male and female genital structures, but *Rotigonalia* has paired paraphyses in the male, and a less produced pygofer and abdominal sternum VII in the female.

I have studied the lectotypes of *Tettigoniella rudicula* Jacobi and *T. facetula* Jacobi.

SPECIES OF *PLEROGONALIA*

rudicula (Jacobi), 1905c:184 (*Tettigoniella*). Peru, Bolivia. New combination.
facetula (Jacobi), 1905c:184 (*Tettigoniella*). New synonymy.

70. SCOPOGONALIA, NEW GENUS

FIGURES 435-442

Type-species: *Tettigonia subolivacea* Stål.

Length 4.8-6.0 mm.

Head moderately produced, median length of crown from four-tenths to two-thirds interocular width and from one-fourth to slightly more than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown convex, usually with a slight transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins convex; clypeus convex, muscle impressions not distinct, face without pubescence, transclypeal suture entire, clypellus not strongly produced, its profile continuing contour of clypeus.

Thorax with pronotal width approximately equal to transocular width of crown, lateral margins slightly convergent anteriorly, dorsopleural carinae almost always complete, posterior margin shallowly concave, disk without punctures and almost always without rugosity, not pubescent; scutellum almost always not striate behind transverse sulcus. Forewing hyaline or coriaceous with membrane including all of apical cells and extending forward along costal margin to basal half of wing, occasionally including apical portion of anteapical cells, veins distinct or not, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins, inner two anteapical cells open basally, surface of wing without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere equal to or (most often) greater than combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, narrowly convex posterodorsally, posteroventral margin very broadly convex, with numerous macrosetae on posterior two-thirds of disk, with a slender process arising along ventral pygofer margin, extending posteriorly or posterodorsally, appearing brushlike at apex (exception: *S. golbachi,* n. sp.). Plates broadly triangular, not extending posteriorly nearly as far as pygofer apex, each narrowed in its apical half, with macrosetae usually multiseriate near base thence uniseriate to apex. Style without a preapical lobe, not extending nearly as far posteriorly as apex of connective. Connective slender, longitudinal, elongate, barlike. Aedeagus curved dorsally, with one or more processes. Paraphysis occurring as a connecting sclerite between apex of connective and base of aedeagal shaft, but appearing as a ventral process or processes of aedeagus, with a process or pair of rami.

Female abdominal sternum VII strongly produced posteriorly and gradually narrowed, posterior margin usually broadly and shallowly emarginate (exceptions: *S. echinura,* n. sp. and *S. golbachi,* n. sp.). Dorsal membrane of genital

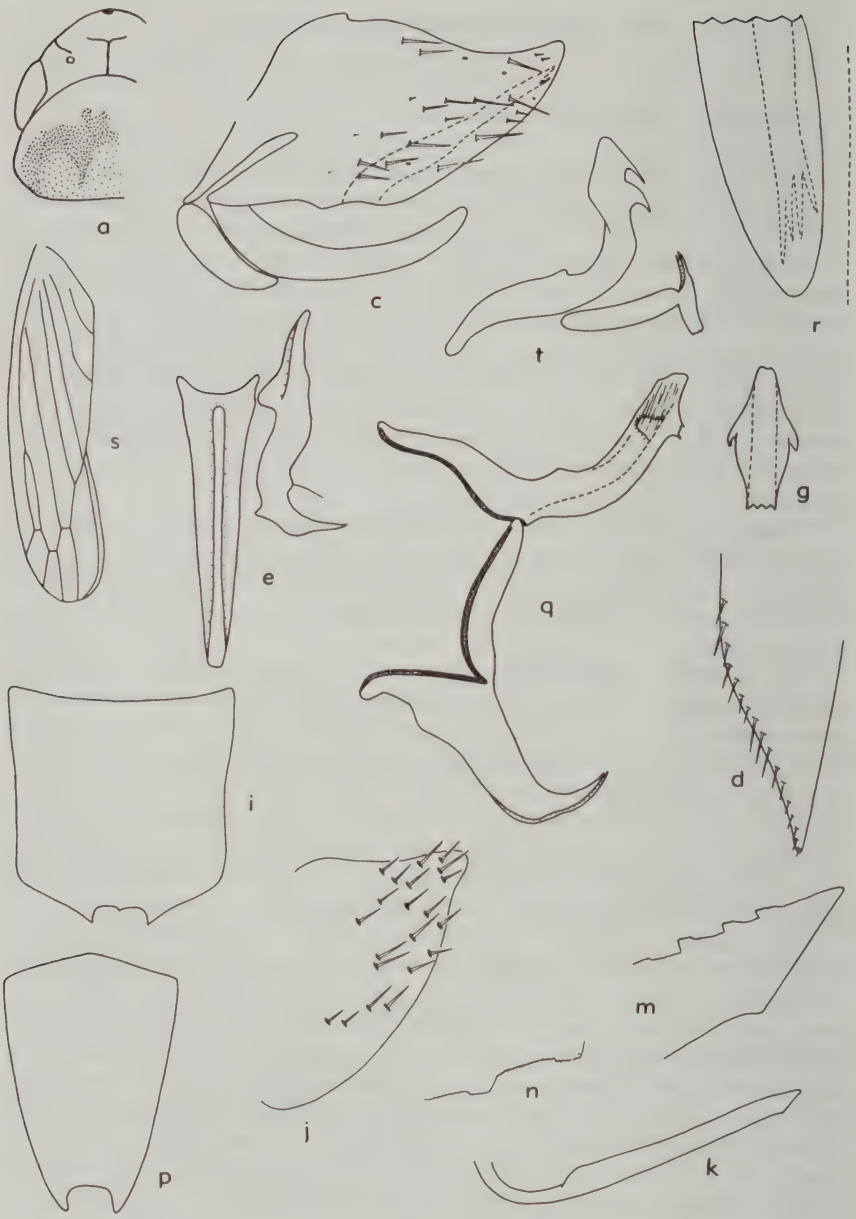


FIGURE 435.—*Scopogonalia subolivacea* (Stål) (*p* from lectotype; *t* from Rio de Janeiro, Brazil; remainder from specimens from Chanchamayo, Peru; *i-k, m, n,* from macerated specimen; *g* showing only aedeagal apex): *p,* Female abdominal sternum VII, not macerated; *q, t,* aedeagus and paraphyses from lateral view; *r,* male pygofer apex, right side, from ventral view; *s,* forewing.

chamber without sclerites. Ovipositor with second valvula expanded and bearing teeth beyond basal curvature, primary teeth widely spaced near base, slightly more closely spaced near apex, primaries bearing minute denticles which continue over areas between primaries, with dorsal anteapical denticulations before acute apex. Pygofer narrowed and subacute apically, with a number of macrosetae on posterior half.

Specimens of *Scopogonalia* vary from sordid light green to darker green or yellowish-olive, to dark with paler green or yellow markings. All of the species have an apical black spot on the head.

Specimens of *Scopogonalia* have been examined from Venezuela, Colombia, Peru, Bolivia, southern Brazil, Paraguay, and northern Argentina. The venation of the forewings and the long connective are similar to *Tylozygus* Fieber, but the connective is subdivided in the latter, and the female genitalia do not support a close relationship. The long connective, the articulation of the paraphyses with both the connective and the aedeagus, and the form of the pygofer processes in *Scopogonalia* are similar to *Plerogonalia,* new genus, a relationship supported by the form and chaetotaxy of the female pygofer and to some extent by the form of the second valvulae of the ovipositor. Species of *Plerogonalia* are much larger and have no open anteapical cells.

Small green or yellowish neotropical Cicadellini are likely to belong in *Scopogonalia, Caldwelliola,* new genus, or in *Chlorogonalia ultima,* n. sp.

My interpretation of *Cicadella interruptula* Osborn rests on a male with an "allotype" label in CM. The specimen is darker than the female labeled "type" but probably conspecific. My interpretation of *Tettigonia subolivacea* Stål is based on a male in MHNP which was from the type-locality and agreed with a sketch I had made earlier of the female lectotype in RMS.

SPECIES OF *SCOPOGONALIA*

echinura, n. sp. Venezuela.
golbachi, n. sp. N. Argentina.
interruptula (Osborn), 1926b:181 *(Cicadella).* Brazil. New combination.
nargena, n. sp. Colombia, Bolivia, Brazil, Argentina.
ogloblini, n. sp. Argentina.
paula, n. sp. S. Brazil.
penicula, n. sp. S. Brazil, Paraguay, N. Argentina.
subolivacea (Stål), 1862e:42 *(Tettigonia).* Peru, Bolivia, S. Brazil, Paraguay, N. Argentina. New combination.

KEY TO MALES OF *SCOPOGONALIA*

1. Pygofer processes not brushlike; aedeagus with a flattened flange bearing three angles at its apex ..... *golbachi,* n. sp., page 538
   With neither of the above characters 2

2. Aedeagus with branches of paraphyses extending beside shaft *nargena,* n. sp., page 532
   Aedeagus with branch or branches of paraphyses extending below shaft 3

3. Paraphyses with an unpaired process ..... *interruptula* (Osborn) (fig. 437)
   Paraphyses with paired processes 4

4. Aedeagus with an apicoventral median shaft process and without other ventral shaft processes 5
   Aedeagus without an apicoventral process, *or* if with a median ventral process that is apical or almost apical, then also with a more basal unpaired median process 6

5. Aedeagal shaft in ventral view sagittate at apex .... *paula*, n. sp., page 534
   Aedeagal shaft in ventral view scarcely expanded at apex *echinura*, n. sp., page 534

6. Aedeagus with an apicoventral process ..... *penicula*, n. sp., page 536
   Aedeagus with median ventral process anteapical 7

7. Style more strongly extended laterally ("toe" longer); paraphyses with basal portion longer, aedeagal shaft sagittate apically in ventral view *subolivacea* (Stål) (fig. 435)
   Style with lateral apical point shorter; paraphyses with basal portion shorter; aedeagal shaft not expanded apically or anteapically in ventral view ..... *ogloblini*, n. sp., page 537

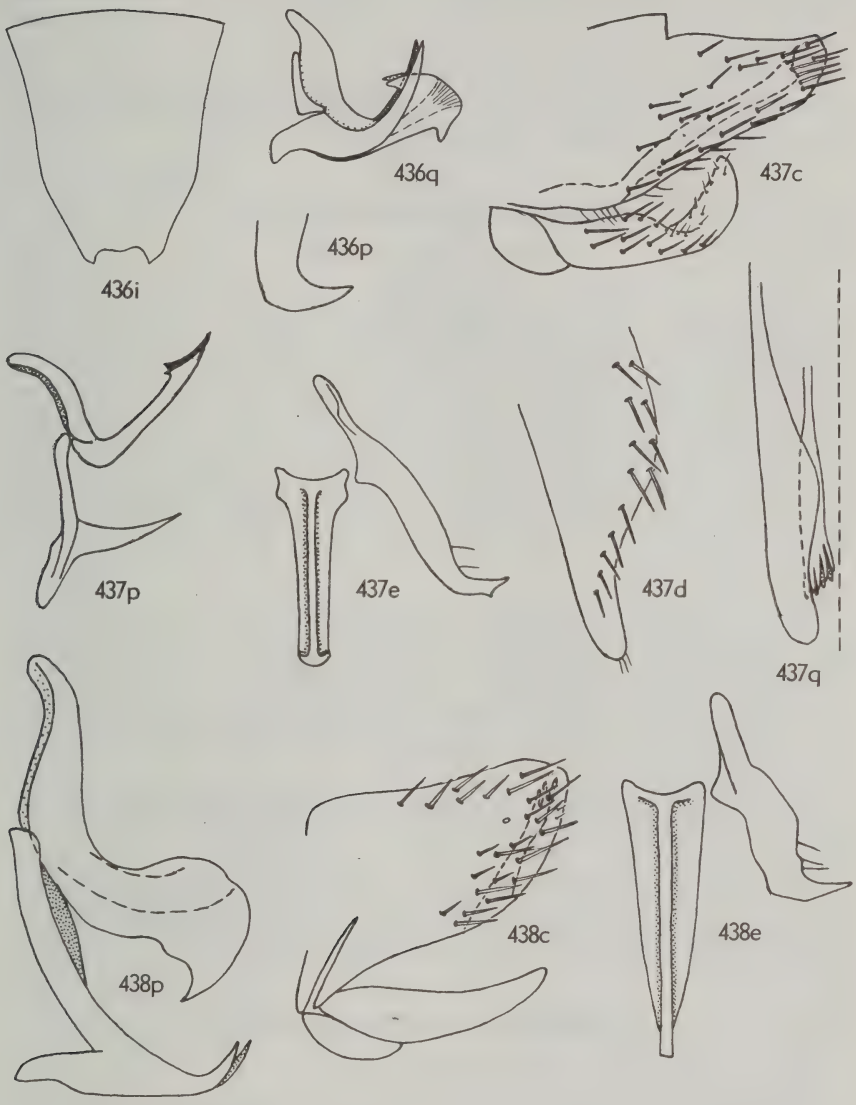
Scopogonalia nargena, NEW SPECIES

FIGURE 436, PAGE 533

Length of male 4.7-4.9 mm, of female 5.1-5.9 mm. Head with median length of crown varying from one-half to slightly less than six-tenths interocular width and from approximately one-fourth to slightly more than one-third transocular width. Forewing hyaline, veins darker; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male style with a strong angular apical projection extending at a right angle from long axis of style; aedeagus expanded apically into dorsal and ventral short acutangular processes; paraphyses extending beside shaft in their basal portion, curved dorsally in apical half, each slender and tapering gradually to acute apex. Female abdominal sternum VII with a black area at base of emargination.

Color yellow or greenish-yellow, pronotum with dark suffusion in some specimens, a black spot in each basal angle of scutellum; face, thoracic pleura, venter, and legs, yellow.

Holotype and one additional male, Santos, São Paulo, Brazil, October, 1961 (Krauss); one male, Brasília, D. F., Brazil, August, 1961 (Krauss); two males and one female, Loreto, Misiones, Argentina, December 10, 1931 (A. A. Ogloblin); one female, same data as preceding except December 1, 1931; one female, same data except November 27, 1931 (USNM). Two males, "Prov. del Sara", Bolivia, C. M. Acc. 5064, Feb. 1913 (Steinbach); two females, same locality and collector, 450 m., Acc. 6443 (CM). One male and one female, Jacarezinho, Parana, Brazil, February 11, 1961 (N. Marston); one



FIGURES 436-438.—436, *Scopogonalia nargena* n. sp. (from specimen from Misiones, Argentina): *p*, Style apex; *q*, aedeagus and paraphyses, from lateral view. 437, *S. interruptula* (Osborn) (from allotype from Chapada, Brazil): *p*, Aedeagus and paraphysis, from lateral view; *q*, male pygofer apex, right side, from ventral view. 438, *S. paula*, n. sp. (from specimen from São Paulo, Brazil): *p*, Aedeagus and paraphyses, from lateral view.

female, same data as preceding except February 14, 1961; one male, "Caiuba", Paraná, Brazil, September 25, 1960 (N. Marston) (Kansas State University).

S. nargena, n. sp., differs from all other species in the genus in the paraphyses which partially overlie the aedeagal shaft in lateral view. In all other species they extend beneath the shaft.

Scopogonalia paula, NEW SPECIES

FIGURE 438, PAGE 533

Length of male 4.8-5.1 mm. Head with median length of crown varying from one-half to slightly more than one-half interocular width, and from approximately three-tenths to slightly less than one-third transocular width. Forewing greenish subhyaline, veins dark; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male style with a strong acutangular apical projection extending at a right angle from long axis of shank; aedeagus with a ventroapical acutangular process directed ventrally; rami of paraphyses extending ventrally beneath aedeagal shaft, the apices of the two rami curved slightly posterodorsally at their apices.

Color of crown, anterior portion of pronotum and most of scutellum, yellow, remainder of dorsum dark greenish, crown with a narrow transverse dark stripe on disk, basal angles of scutellum black (but mostly concealed beneath pronotum); face pale with a median fuscous linear area on clypellus and with or without a pair of fuscous lines on clypeus; proepimeron with a black area beneath dorsopleural carina, mesosternum black; remainder of venter and legs, yellow.

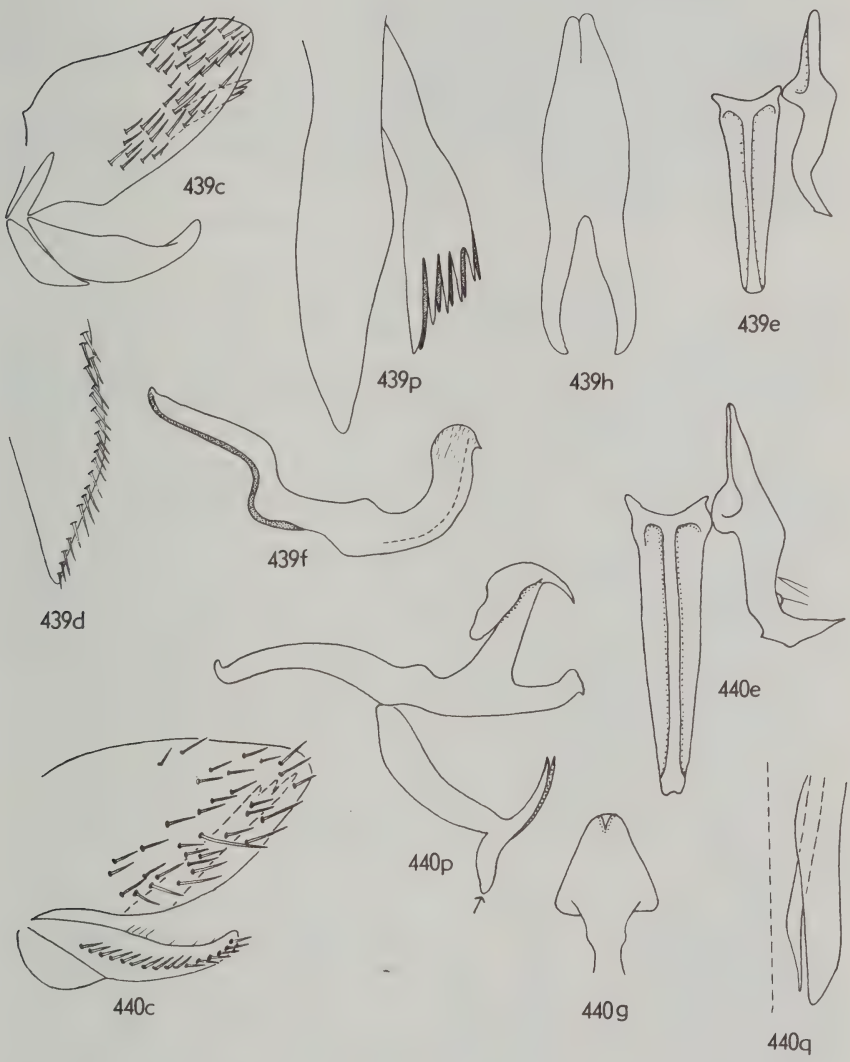
Holotype male, São Paulo, S. P., Brazil, June, 1961 (Krauss) and two additional males, Ribeiro Pires, Brazil, May, 1954 and June 28, 1961 (N.L.H. Krauss) (USNM).

S. paula, n. sp., is similar to *S. echinura,* n. sp., from which it may be distinguished by the characters used in the key and by the conspicuous angular apical aedeagal projection which is not present in *echinura.*

Scopogonalia echinura, NEW SPECIES

FIGURE 439, PAGE 535

Length of male and female 6.0 mm. Head with median length of crown varying from slightly more than four-tenths to slightly less than one-half interocular width and approximately one-fourth to three-tenths transocular width. Forewing hyaline, veins concolorous; hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Male style obliquely truncate at apex, without a strong angular apical projection; aedeagus with a small ventral acutangular process at apex, shaft not sagittate apically in caudoventral view; paraphyses extending below shaft



FIGURES 439, 440.—439, *Scopogonalia echinura,* n. sp., holotype: *p,* Male pygofer apex, right side, from ventral view. 440, *S. penicula,* n. sp. (from specimen from São Paulo, Brazil; only apex of aedeagal shaft shown in *g*): *p,* Aedeagus and paraphyses (arrow shows location of articulation with connective); *q,* male pygofer apex, left side, from ventral view.

in lateral view. Female abdominal sternum VII not emarginate at middle, narrowly rounded at apex.

Color entirely pale brown except a faint darker longitudinal suffusion on forewing in corium parallel to claval suture.

Holotype male (paraphyses lost) and two females, Santa Elena de Uairén, Venezuela, October 20, 1940 (P. Anduze) (USNM).

S. echinura, n. sp., is similar in structure of male genitalia to both *S. paula,* n. sp., and *S. subolivacea* (Stål). The lack of an angular projection at the style apex and the scarcely expanded aedeagal shaft will separate it readily from both of these species.

Scopogonalia penicula, NEW SPECIES

FIGURE 440, PAGE 534

Length of male 4.8-5.2 mm, of female 5.5-5.6 mm. Head with median length of crown varying from one-half to approximately six-tenths interocular width and from three-tenths to less than four-tenths transocular width. Forewing with usually only apical cells and a marginal area extending into basal half of wing, membranous; hindleg with length of first tarsomere equal to or greater than combined length of two more distal tarsomeres. Male style with a strong angular apical projection extending at a right angle from long axis of style; aedeagus with a conspicuous process from ventral margin at its midlength, apex with a narrow acutangular process extending posteriorly and an anterodorsal hoodlike apical structure, aedeagal apex sagittiform in caudal view; paraphyses extending below shaft, biramous with rami slender and acute apically. Female abdominal sternum VII emarginate apically.

Color variable but with crown pale yellow, often with a discal transverse narrow black stripe, forewings with dark veins, often with pale areoles in claval apex and some of cells of corium; face and venter varying from unmarked yellow to yellow with faint dark stripes on clypeus, and/or a propleural dark spot under dorsopleural carina and/or a black mesosternum; legs, yellow.

Holotype and one additional male and two females, Loreto, Misiones, Argentina, December 1, 1931 (A. A. Ogloblin); three females, same data except December 3, 1931; three males and one female, same data except December 6, 1931; one female, same data except December 10, 1931; one male, same data except December 12, 1931; one male, same data except December 14, 1931; two females, same data except December 18, 1931; two males and one female, November 25, 1931; one female, same data except November 27, 1931; one male and one female, same data except November 29, 1931 (USNM). Two males, Independencia, Paraguay, October 10, 1951 (SSM). One female, Curitiba, Paraná, Brazil, August 21, 1960 (N. Marston); two females, same data except February 6, 1961; one female, São Paulo, S. P., Brazil, April 1, 1961 (N. Marston); one male, Taquara, Rio Grande do Sul, February 23, 1961 (N. Marston) (Kansas State University). Two males and eight females, Nova Teutonia, Santa Catharina, Brazil, January 4, 1950

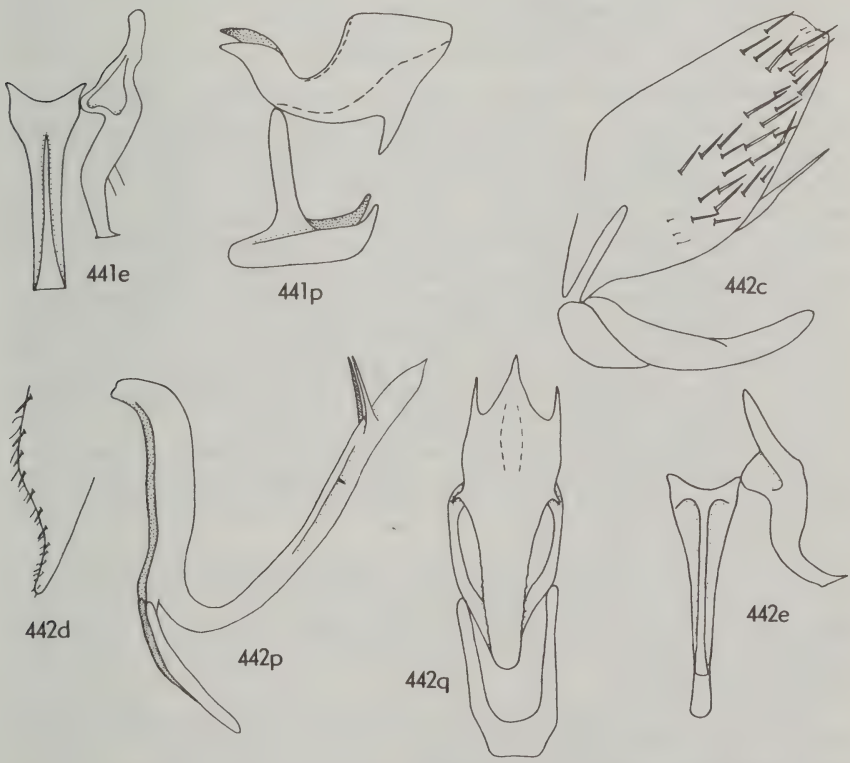
(Plaumann); two females, same locality, April 27, 1950 (Fritz Plaumann); one male and one female, same data as preceding except April 28, 1950; one male and two females, same data except April 29, 1950; one female, same data except May 5, 1950; one female, same data except July 21, 1943; one female, same data except August 26, 1944; one female, same data except September 8, 1944; and one female, same data except May 25, 1945 (NCS).

S. penicula, n. sp., may be separated readily from other species of the genus by the shape of the process near the middle of the aedeagal shaft.

Scopogonalia ogloblini, NEW SPECIES

FIGURE 441

Length of male 4.9-6.0 mm. Head with median length of crown varying from one-half to six-tenths interocular width and from approximately one-fourth to slightly less than four-tenths transocular width. Forewing hyaline with veins concolorous or with only a few veins darker; hindleg with length of



FIGURES 441, 442,—441, *Scopogonalia ogoblini,* n. sp., holotype: *p,* Aedeagus and paraphyses, from lateral view. 442, *S. golbachi,* n. sp., topotype: *p,* Aedeagus and paraphyses, from lateral view; *q,* the same from caudoventral view.

first tarsomere approximately equal to combined length of two more distal tarsomeres. Male style truncate apically, with only a small acute angle extending at right angle to long axis of style (fig. 441*e*); aedeagus broadened in apical one-half and with an anteapical acutangular ventral process directed ventrad; paraphyses extending below shaft, consisting of very short basal portion and two short rami curved dorsally at their apices.

Color of crown and pronotum pale brownish, of scutellum pale brown (type) or yellow, with a slightly darker area on pronotum behind each eye; face reddish brown, proepimeron with a black marking below dorsopleural carina, remainder of pleura, venter, and legs, dull yellow.

Holotype male, Loreto, Misiones, Argentina, December 8, 1931 (A. A. Ogloblin) and one additional male, same data except December 10, 1931 (USNM).

S. ogloblini, n. sp., may be distinguished from other species in the genus by the characters used in the key.

Scopogonalia golbachi, NEW SPECIES

FIGURE 442, PAGE 537

Length of male 4.8-5.3 mm, of female 5.2-5.3 mm. Head with median length of crown varying from less than six-tenths to two-thirds interocular width and from slightly more than one-third to slightly more than four-tenths transocular width. Forewing with clavus and adjacent portion of corium coriaceous; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer process not brushlike in appearance; style with apical angle not as strong as in *S. nargena*, n. sp. Aedeagus longer than in other species in the genus, its apical half with a broadened flange that bears three large apical angles and a much smaller lateral angle on each side; paraphyses a narrow U-shaped structure with closed end at apex. Female abdominal sternum VII produced and narrowly rounded to angular apically, with a black area at apex.

Color of crown, anterior portion of pronotum, and scutellum, yellow, with at least a median transverse black spot on disk of crown, at least two pairs of black spots on pronotum; scutellum with basal angles brown or black; longitudinal veins black except vein R.

Holotype and six additional males, two female, and two specimens without abdomen, Urundel, Salta, Argentina, January 31, 1950 (R. Golbach); two males and four females, Aguarez, Salta, Argentina, February 14, 1950 (R. Golbach); two females, Embarcación, Argentina, February 2, 1950 (R. Golbach) (all IML).

The lack of an emargination on the seventh abdominal sternum of the female, and of brushlike pygofer processes in the male will separate *S. golbachi*, n. sp., from other species in the genus.

S. golbachi is named in honor of the collector of the type-series.

71. Genus CYCLOGONIA Melichar

Figures 443-449

Cyclogonia Melichar, 1926a:350. Type-species: *Tettigoniella cyclopula* Jacobi, by original designation.

Length 7.6-9.6 mm.

Head slightly produced, median length of crown from slightly less than four-tenths to one-half interocular width and from one-fifth to slightly more than one-fourth transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, relative distance from ocellus to median line of crown and to adjacent anterior eye angle variable interspecifically, crown with or without a transverse concavity before ocelli (variable intraspecifically), surface without distinct sculpturing, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus flattened medially, sculpturing of flattened portion varying from finely granulate to irregularly rugose, muscle impressions distinct; face without pubescence or with weak pubescence at apex of clypellus (variable interspecifically), transclypeal suture interrupted medially, clypellus completely (*C. serenula* Breddin)) continuing contour of clypeus or curved more abruptly posteriorly in profile (all other species).

Thorax with pronotal width equal to or greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete or not (varying interspecifically), posterior margin concave, disk without punctures and usually without transverse rugosity (variable interspecifically); scutellum not striate behind transverse sulcus. Forewing with or without a membrane, veins not distinct, not elevated, inner anteapical cell open basally, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; posterior extent of forewings of female relative to that of ovipositor unknown except in *serenula* (Breddin) in which the apex of the ovipositor is exceeded by the forewings. Hindleg with femoral setal formula 2:1:1; length of first tarsomere slightly greater than combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly, posterior margin varying from narrowly to broadly convex, macrosetae numerous and with distribution either: *a*. multiseriate and extending submarginally parallel to dorsal margin anteapically, parallel to apical margin anteapically and parallel to posteroventral margin anteroventrally; or *b*. fairly uniform over posterior half of pygofer; pygofer without processes. Plates slender, triangular, not extending as far posteriorly as pygofer apex, with uniseriate macrosetae. Style not extending posteriorly nearly as far as apex of connective, with distinct preapical lobe. Connective elongate, Y-shaped, the arms short. Aedeagus elongate, curved gradually ventrad. Paraphyses consisting of a slender basal

piece and a pair of slender elongate acute rami which are usually asymmetrical as a result of lying in asymmetrical planes, but occasionally slightly asymmetrical in shape.

Female (described entirely from *C. serenula* (Breddin)) abdominal sternum VII short, with posterior margin transverse and with a slight convexity at middle. Dorsal wall of genital chamber with a lightly sclerotized area on each

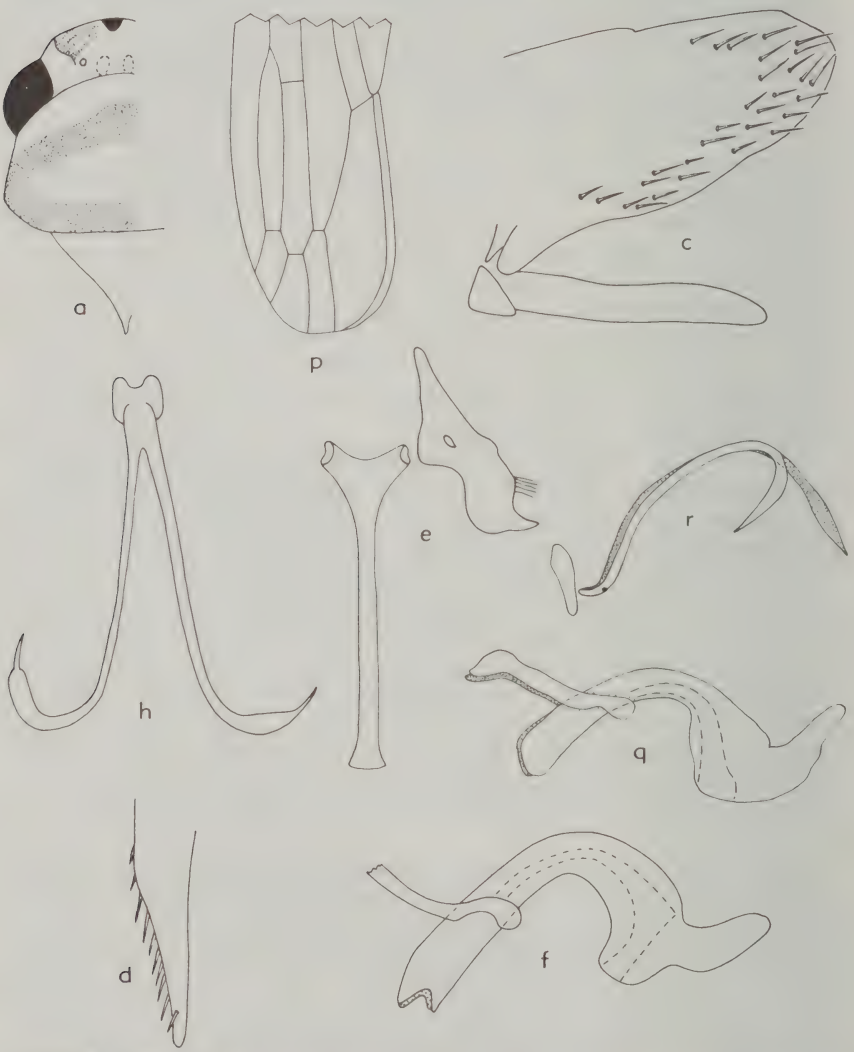


FIGURE 443.—*Cyclogonia cyclopula* (Jacobi) (*a* from specimen from Yungas de Palmar, Bolivia; *q*, *r*, from Coroico Yungas, Bolivia; remainder from lectotype; *h* from dorsal view): *p*, Apex of forewing; *q*, aedeagus from lateral view; *r*, paraphyses from lateral view.

side. Ovipositor with second valvula broadly expanded through most of portion beyond basal curvature, with sloping quadrate primary teeth, closely spaced near apex, more widely spaced near base, many with secondary denticles, with anteapical denticles on dorsal and posteroventral margins. Pygofer not strongly produced, with numerous macrosetae located parallel to posteroventral margin.

Cyclogonia ranges from Ecuador to Bolivia, and Brazil. The structure of the female genitalia is similar to that found in *Tylozygus* Fieber; the male genitalia indicate a relationship to the new genera *Rotigonalia* and *Plerogonalia*.

My identification of *Tettigoniella cyclopula* Jacobi is based on a study of the male lectotype. I have examined three syntype specimens of the type-series of *Cicadella ornatula* Osborn from OSU. No holotype was designated in the original description. The lectotype is selected here. It is a male, with labels: "Coroico Yungas/Bolivia/Apr. 16, '99" and "Cicadella/Holotype/Cicadella/ornatula/Osb.", in addition to Osborn's determination label and the lectotype label.

The genitalia of the lectotype of *Tettigoniella praetextatula* Jacobi are like the specimen from Callanga, Peru illustrated in figure 447.

I have examined three syntypes of *Cicadella scutellatula* Osborn, for which no holotype was mentioned in the original description. I select, as lectotype, a male from OSU with labels: "Chulumani/Bolivia/Dec. 9, '98" and "Holotype/ Cicadella/scutellatula/Osborn" and Osborn's determination label and the lectotype label. I did not dissect the lectotype. I have studied the lectotype of *Ceratogonia insurgens* Melichar, of which the genitalia are like figure 448.

SPECIES OF *CYCLOGONIA*

aymara, n. sp. Peru, Bolivia.
cyclopula (Jacobi), 1905c:183 *(Tettigoniella)*. Peru, Bolivia.
ornatula (Osborn), 1926b:216 *(Cicadella)*. New synonymy.
praetextatula (Jacobi), 1905c:184 *(Tettigoniella)*. Peru, Bolivia, Brazil. New combination.
scutellatula (Osborn), 1926b:215 *(Cicadella)*. Bolivia. New combination.
insurgens (Melichar), 1926a:352 *(Ceratogonia)*. New synonymy.
serenula (Breddin), 1901c:76 *(Tettigonia)*. Ecuador. New combination.
sumai, n. sp. Bolivia.
urula, n. sp. Bolivia.

KEY TO MALES OF *CYCLOGONIA*

1. Aedeagus with a narrow dorsoapical process which is directed dorsally 2
   Aedeagus not as above 3

2. Apex of head with a distinct black spot; forewings with orange and blue color pattern ..... *cyclopula* (Jacobi) (fig. 443)
   Apex of head without a distinct black spot; forewings with tan and yellow color pattern ..... *urula,* n. sp., page 543

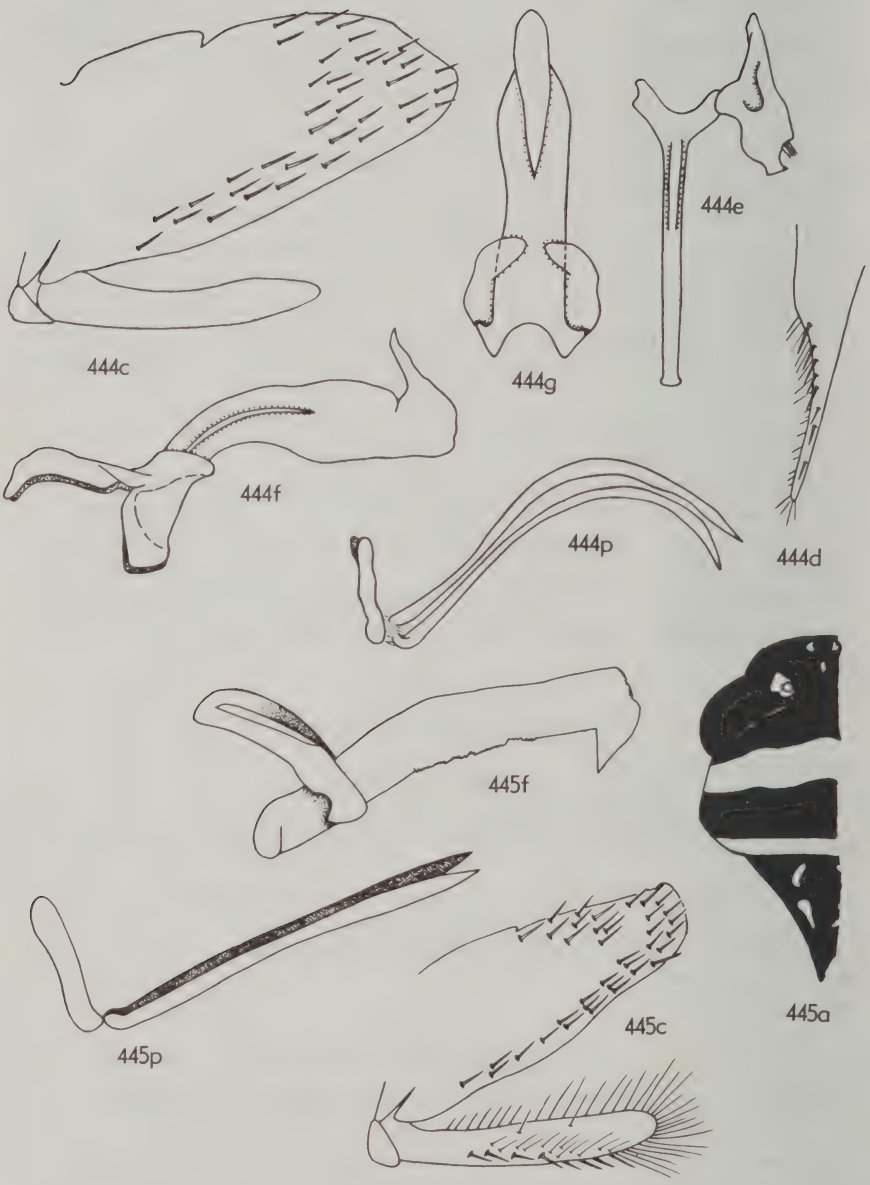


FIGURE 444, 445.—444, *Cyclogonia urula,* n. sp., holotype: *p,* Paraphyses from lateral view. 445, *C. sumai,* n. sp., holotype: *p,* Paraphyses from lateral view.

3. Aedeagus with an apicoventral process directed ventrally (fig. 445*f*) *sumai*, n. sp., page 545
   Aedeagus without such a process 4
4. Pronotum with width approximately equal to transocular width of head 5
   Pronotum with width distinctly greater than transocular width of head 6
5. Aedeagus narrowed anteapically in lateral view, broadest apically *aymara*, n. sp., page 547
   Aedeagus broadest anteapically ..... *praetextatula* (Jacobi) (fig. 447)
6. Aedeagus with ventral processes near base of shaft *scutellatula* (Osborn) (fig. 448)
   Aedeagus without processes ..... *serenula* (Breddin) (fig. 449)

Cyclogonia urula, NEW SPECIES

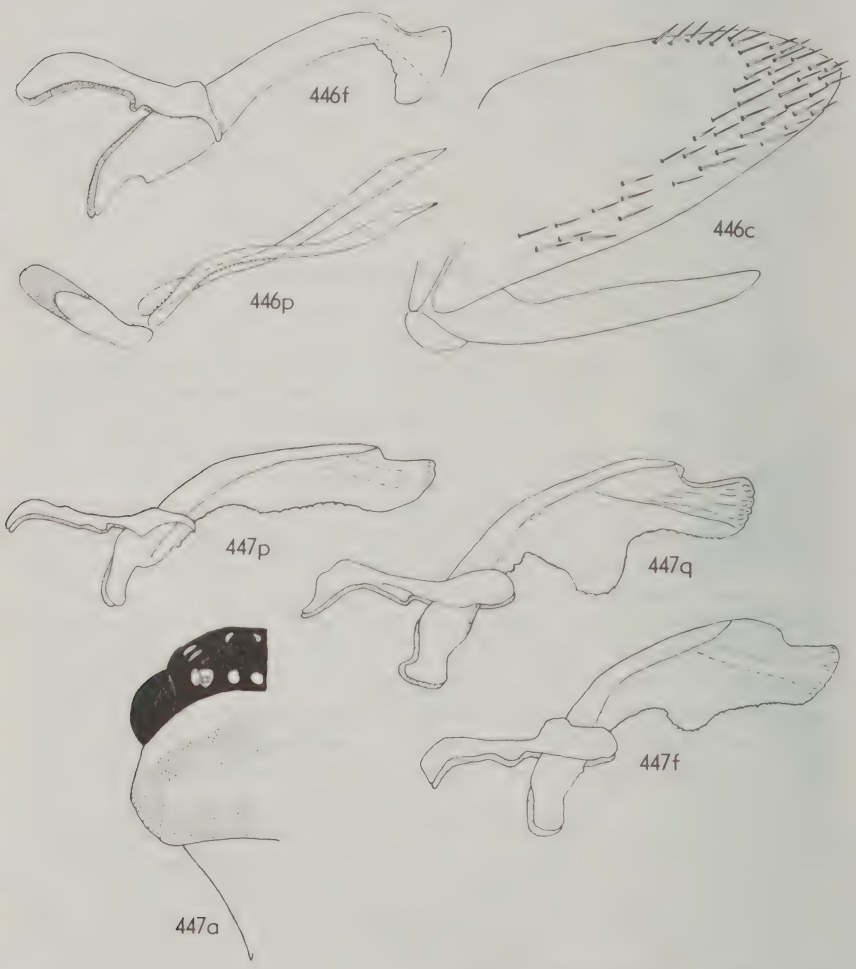
FIGURE 444, PAGE 542

Length of male 8.9 mm. Head with median length of crown slightly more than four-tenths interocular width, and approximately one-fourth transocular width, ocelli equidistant from anterior eye angles and median line of crown, crown with a transverse concavity before ocelli; face with clypeus irregularly rugose medially, clypellus without distinct pubescence at apex, clypellus with apical half curved more abruptly posteriorly than remainder of profile of face. Thorax with pronotal width greater than transocular width of head, dorsopleural carinae complete; forewing without a membrane; hindleg with femoral setal formula 2:1:1, length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer strongly produced posteriorly with dorsoapical margin almost rectilinear, setae arranged as in *a* in generic description; aedeagus with a dorsoapical slender, acute process extending dorsally; paraphyses asymmetrical. Female unknown.

Head with crown marked much as in *C. praetextatula* (Jacobi) illustration (fig. 447*a*) but with pale arcs more extensive on muscle impressions and anteriormost pair of spots located farther forward, at transition to face; pronotum with three transverse bands, the anteriormost brown (shaded to black anteromedially), the middle one green shaded with yellow, the posterior one black and slightly wider than other two, all three of the bands reaching lateral margins; scutellum black; forewing brown, claval suture broadly yellow in basal half, narrowly yellowish-green in apical half, a narrow yellowish-green stripe in apical half of brachial cell and another such stripe parallel to costal margin extending from basal third of forewing to apical margin of outer anteapical cell; face as in *C. sumai*, n. sp., thoracic pleura yellow; legs stramineous.

Holotype male, Chulumani, Bolivia, December 9, 1898 (USNM). One male, Coroico, Yungas, Bolivia, August 16, 1899 (OSU).

C. urula, n. sp., is similar to *C. cyclopula* (Jacobi) in the structure of the male genitalia. It can be readily distinguished from *cyclopula* by the less strongly arched aedeagus in lateral view in *urula* and by the dorsoapical aedeagal process which is narrow and more slender in *urula*.



FIGURES 446, 447.—446, *Cyclogonia aymara*, n. sp., holotype: *p*, Paraphyses from lateral view. 447, *C. praetextatula* (Jacobi) (*a*, *f*, from specimen from Callanga, Peru; *p* from Itaituba, Brazil; *q* from Chulumani, Bolivia): *p*, *q*, Aedeagus from lateral view.

Cyclogonia sumai, NEW SPECIES

FIGURE 445, PAGE 542

Length of male 8.5-8.7 mm. Head with median length of crown from slightly less to slightly more than four-tenths interocular width, and approximately one-fourth transocular width, ocelli equidistant from anterior eye angles and median line of crown, crown with a transverse concavity before ocelli; face with clypeus granular medially, clypellus weakly pubescent apically, clypellus with apical half curved more abruptly posteriorly than remainder of profile of face. Thorax with pronotal width approximately equal to transocular width of head, dorsopleural carinae complete; forewing with membrane including all apical cells and extending forward along costal margin; hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer strongly produced posteriorly with apex broadly convex in lateral view, setae arranged as in *a* in generic description; aedeagus with an apical acute process directed ventrally; paraphyses symmetrical. Female unknown.

Head with crown black with a median and two lateral small spots near apex, and a spot surrounding each ocellus, yellow, with or without (holotype) a pair of small yellow spots near middle of posterior margin; pronotum black

FIGURE 448.—*Cyclogonia scutellatula* (Osborn) (*a* from specimen from Yungas de Palmar, Bolivia; remainder from Bolivia; *h* from dorsal view).

with a broad yellowish-green stripe across disk near midlength and a narrower transverse green band along hind margin; scutellum black with four small narrow arcuate yellow spots; forewing black with a number of the cells dark green; face with clypeus and clypellus black medially, pale laterally; thoracic pleura and sterna sordid yellow shading to black; legs and abdominal venter sordid yellow.

Holotype and one additional male, Yungas de Palmar, Bolivia, 100 m., November 1960 (A. Martínez) (SSM).

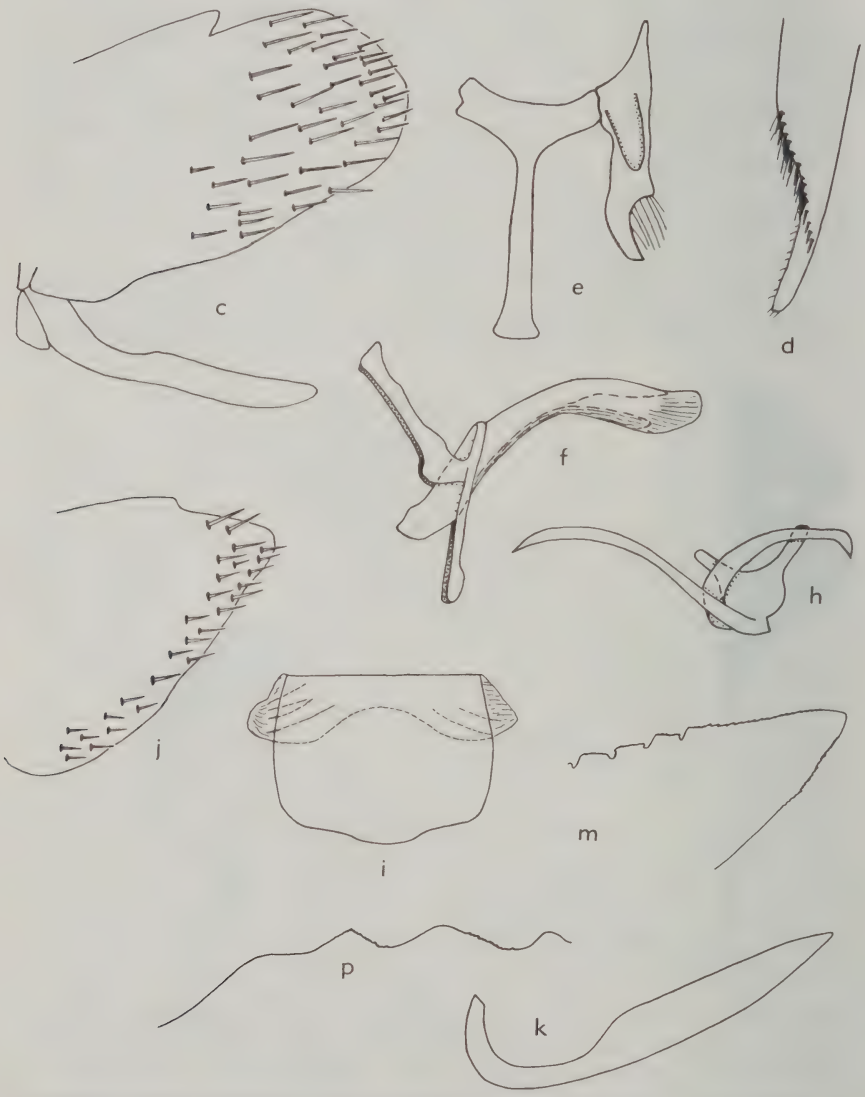


FIGURE 449.—*Cyclogonia serenula* (Breddin) (from specimens from Baños, Ecuador; *h* from caudal view): *p*, Teeth at base of second valvula.

C. sumai, n. sp., differs from all other species in the genus in the ventrally directed apical aedeagal process and in the symmetrical paraphyses.

Cyclogonia aymara, NEW SPECIES

FIGURE 446

Length of male 9.5-9.6 mm. Head with median length of crown four-tenths or slightly less than four-tenths interocular width and from slightly more than one-fifth to approximately one-fourth transocular width, ocelli equidistant from anterior eye angles and median line of crown, crown with a transverse concavity before ocelli; face with clypeus irregularly rugose medially, clypellus without or with very weak pubescence at apex, clypellus with apical half curved more abruptly posteriorly than remainder of profile of face. Thorax with pronotal width approximately equal to transocular width of head, dorsopleural carinae complete; forewing with membrane including all or almost all of apical cells, not sharply delimited from remainder of wing, not extending forward along costal margin; hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer very strongly produced posteriorly, with apex very narrowly rounded in lateral view, setae arranged as in *a* in generic description; aedeagus in lateral view narrowed anteapically, widened apically, with apical margin broadly convex, shaft without a process; paraphyses asymmetrical. Female unknown.

Head with crown black with a pair of small anteapical yellow spots and four pale basal spots in a transverse row; pronotum dark green shaded with yellow, except a brown anterior marginal band and a similar narrow transverse band near middle of green portion, not reaching either lateral margin; scutellum and forewings brown, with very weak greenish shading in some of cells; face with upper portion of clypeus dark medially with a median yellow spot, clypeus shading to brown below, but with muscle impressions darker; remainder of face, thoracic pleura, and legs, sordid yellow.

Holotype male, Coroico Yungas, Bolivia, April 16, 1899; two males, Chulumani, Bolivia, December 9, 1898 (USNM). One male, Bolivia, 1898 (Noualhier) (MHNP). One male, Rioja, Peru, and three additional specimens from Peru; one male, Bolivia (HNHM).

C. aymara, n. sp., differs from other species in the genus in its narrower pygofer which is almost acute apically, and in the distinctive form of the aedeagus in lateral view. The anterior dorsum, not illustrated here, is like *C. praetextatula* (Jacobi) (fig. 447*a*).

72. BEIRNEOLA, NEW GENUS

FIGURES 450-456

Type-species: *Tettigonia anita* Fowler.

Length 5.2-6.6 mm.

Head not strongly produced, with anterior margin broadly rounded, median length of crown varying from slightly less than six-tenths to slightly more

than seven-tenths interocular width and from slightly more than one-third to slightly more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each ocellus closer to median line of crown than to adjacent anterior eye angle, crown without a transverse concavity at ocelli (exception: *Beirneola pensilis*, n. sp.) and without a median longitudinal concavity (exception: *B. albiceps* (Fowler)), surface without sculpturing or setae; lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins rectilinear and almost vertical; clypeus convex medially, muscle impressions not very distinct, transclypeal suture obsolete at middle, clypellus distinctly produced with the contour of its lower portion more nearly horizontal than remainder of profile of face (exception: *albiceps*).

Thorax with pronotal width less than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete, disk without sculpturing or pubescence; scutellum not transversely striate behind transverse sulcus. Forewing without a membrane; veins not elevated, not very distinct, with three closed anteapical cells, of which the bases of the inner two are slightly and the outermost greatly proximal to a line drawn across wing at claval apex, with four apical cells of which the base of the fourth is usually more proximal than the base of the third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced and moderately to strongly convex posterodorsally, with few to many (usually) macrosetae on posterior half to two-thirds of surface, occasionally with a number of interspersed microsetae, pygofer processes absent. Plates slender, triangular, not extending posteriorly nearly as far as pygofer apex, with macrosetae very few and located basad of midlength. Style extending posteriorly to a variable degree in relation to apex of connective, apex varying specifically from truncate to acute. Aedeagus with shaft directed ventrally, without processes, but with a short apicoventral angle in some specimens. Paraphyses with stalk slender and elongate, rami elongate, slender, and tapering, not symmetrical.

Female abdominal sternum VII greatly variable interspecifically. Genital chamber with or without sclerites. Ovipositor with dorsal quadrate primary teeth on approximately apical two-thirds of portion of second valvulae beyond basal curvature; apex of second valvula rounded posterodorsally and with minute anteapical dorsal and ventral denticles not or scarcely visible (at 160×).

Specimens of *Beirneola*, new genus, are variable interspecifically in color.

Beirneola ranges from Costa Rica to Ecuador. It is similar to *Fusigonalia*, new genus, in color pattern, and the latter contains species with a decurved aedeagus, but none with asymmetrical paraphyses, a characteristic of *Beirneola*.

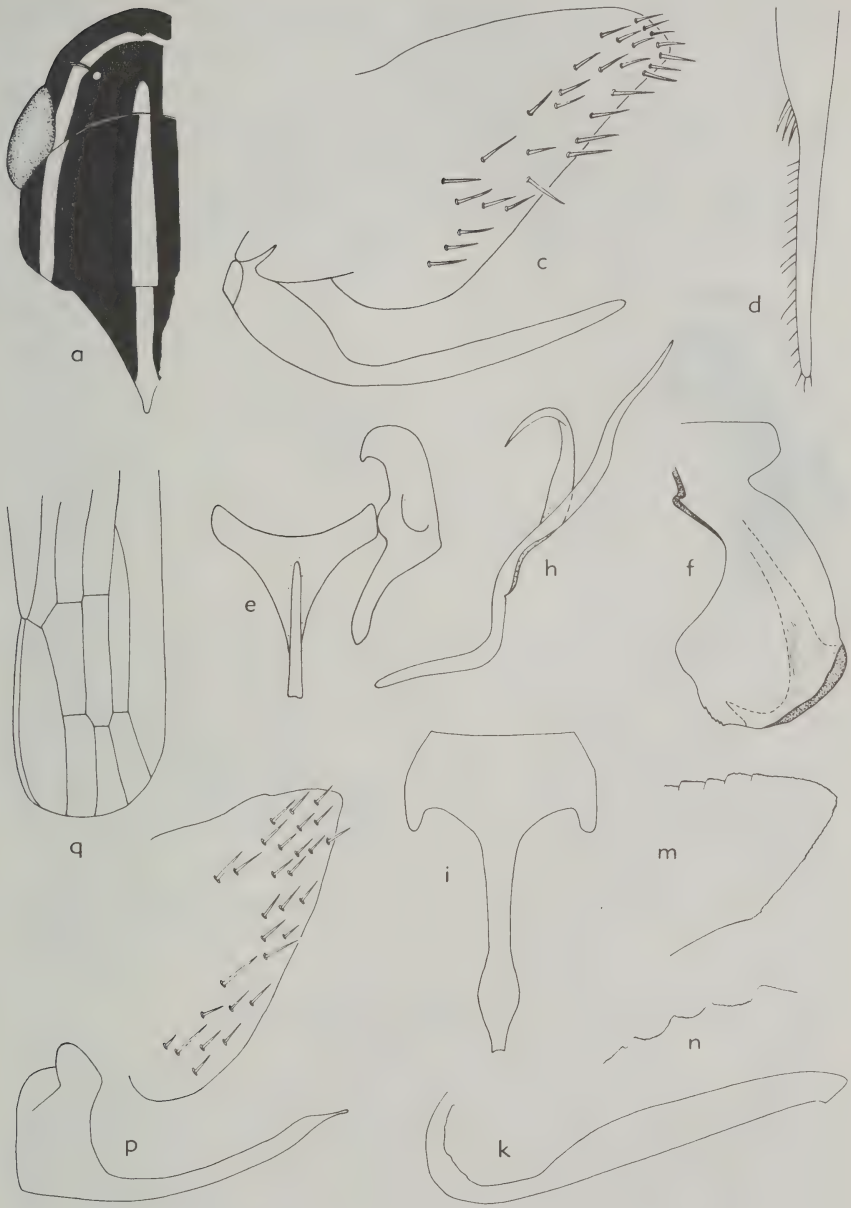


FIGURE 450.—*Beirneola anita* (Fowler) (*i, k, m, n, p,* from specimen from Waldeck, Costa Rica; *q* from Baños, Ecuador; remainder from specimens from Panama; *h* from lateral view): *p,* Female pygofer and seventh sternum, from lateral view; *q,* apical portion of forewing.

My study of the female lectotype of *Tettigonia albiceps* Fowler is the basis of the present interpretation of that specis. The male genitalia, not illustrated here, are much similar to those of *B. pensilis*, n. sp. (fig. 455).

I have seen only the female lectotype of *Tettigonia alboparallela* Signoret, and it was not at hand when the key to species was written. It is placed in *Beirneloa* chiefly on the basis of the original illustration (1855d: pl. 24, fig. 2).

My interpretation of *Tettigonia anita* Fowler is based on an examination of the lectotype and a dissection of a specimen compared with the lectotype, and subsequent dissections of other males. A single specimen from MMB bearing

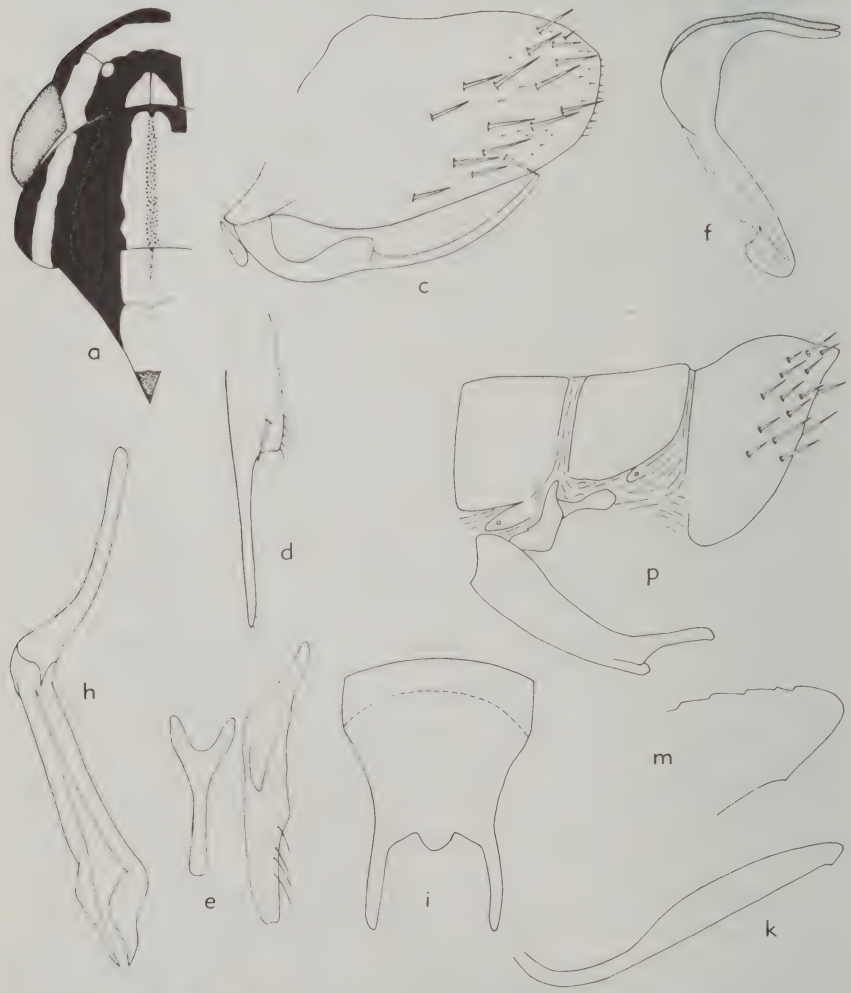


FIGURE 451.—*Beirneola coripana*, n. sp. (*a*, *i*, *k*, *m*, *p*, from specimen from El Valle, Panama; remainder from Waldeck, Costa Rica; *h* from dorsal view): *p*, Apex of female abdomen except anal tube, from lateral view.

Melichar's determination label is the basis of my interpretation of *inverta* (Melichar). The present identification of *Tettigonia carissima* Fowler is based on the male lectotype, which is illustrated here (fig. 453).

SPECIES OF *BEIRNEOLA*

albiceps (Fowler), 1900b:265 (*Tettigonia*). Costa Rica, Panama. New combination.
alboparallela (Signoret), 1855d:784 (*Tettigonia*). New combination.
anita (Fowler), 1900d:281 (*Tettigonia*). Costa Rica, Panama, Venezuela, Ecuador. New combination.
inverta (Melichar), 1926a:369 (*Entogonia*). New synonymy.
carissima (Fowler), 1900c:280 (*Tettigonia*). Panama. New combination.
coripana, n. sp. Costa Rica, Panama.
doriona, n. sp. Colombia.
pensilis, n. sp. Costa Rica.

KEY TO MALES OF *BEIRNEOLA*

(*B. alboparallela* (Signoret) not included)

1. Crown with stripes 2
   Crown without stripes 5

2. Crown with median pale stripe thoughout its length ..... *doriona*, n. sp., page 552
   Crown without a median pale stripe 3

3. Style short and broadly truncate at apex, not extending posteriorly as far as apex of connective ..... *carissima* (Fowler) (fig. 453)
   Style acute apically or extending posteriorly as far as or farther than apex of connective 4

4. Style very narrow apically, not extending posteriorly beyond apex of connective, plates gradually narrowed ..... *anita* (Fowler) (fig. 450)
   Style broader at apex (fig. 451*e*) and extending posteriorly beyond apex of connective, plates abruptly narrowed ..... *coripana*, n. sp.

5. Pronotum with conspicuous brown vittae ..... *pensilis*, n. sp., page 555
   Pronotum without vittae ..... *albiceps* (Fowler) (fig. 454)

Beirneola coripana, NEW SPECIES

FIGURE 451, PAGE 550

Length of male 5.2 mm, of female 5.4-5.5 mm. Head with median length of crown varying from slightly less than six-tenths to approximately seven-tenths interocular width, and from slightly more than one-third to approximately four-tenths transocular width. Male pygofer with posterior margin broadly convex posterodorsally, with a number of microsetae interspersed with the macrosetae; plates abruptly narrowed in basal one-half; style extending posteriorly beyond apex of connective, truncate apically. Female abdominal sternum VII with posterolateral lobes slender and elongate, the deep posterior concavity between them bearing a short median convexity; pygofer setae not

extending as far ventrally as in *B. anita* (Fowler); second valvulae with primary teeth broader and fewer than in *anita*.

Crown with submarginal pale band as in *B. doriona*, n. sp. (below), but the band with a broad complete posterior margin of black enclosing a small median pale yellowish semicircular area on posterior margin; pronotum with three longitudinal percurrent pale bands of which median one bears a very thin median inconspicuous black line which extends, with the pale line which it bisects, almost to apex of scutellum; markings of clavus as in *doriona;* corium with a slender elongate stripe in middle third of length of wing in middle of width of corium, a marking in the form of an inverted exclamation point (!) along outer margin of inner apical cell, and a transverse slender, lobate spot extending from costal margin into base of outer apical cell, yellow to orange; otherwise colored as in *doriona*.

Holotype male, "Waldeck", Costa Rica, February 10, 1934 (C. H. Ballou), "Costa Rica No. 2435"; one male and one female, El Valle, Panama, August, 1948 (N. L. H. Krauss) (USNM).

Beirneola coripana, n. sp., is similar externally to *B. anita* (Fowler) from which it differs in its narrow median dark line on the pronotum, its more abruptly narrowed male plates, its broader style apices, and in the female by its lack of a slender elongate acute median process from the posterior margin of abdominal VII.

Beirneola doriona, NEW SPECIES

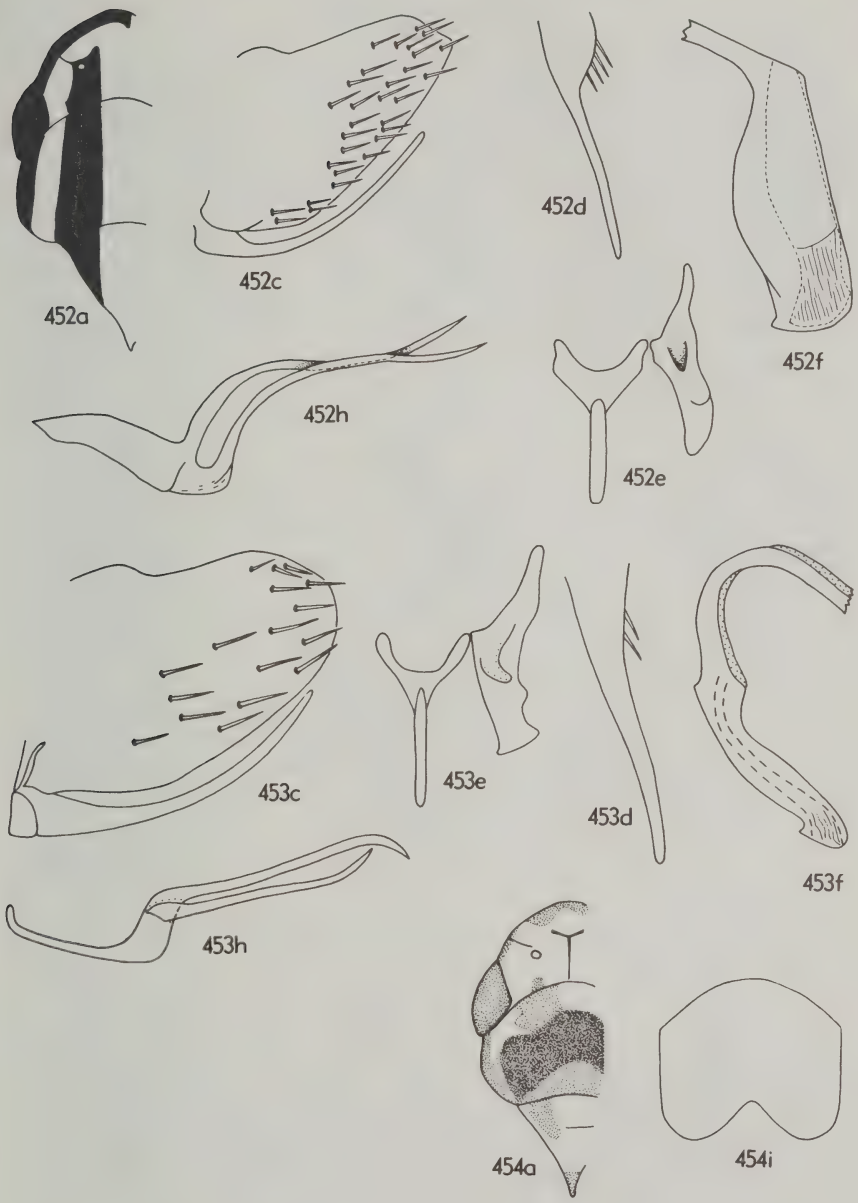
FIGURE 452, PAGE 553

Length of male 6.2-6.5 mm. Head with median length of crown varying from slightly less than six-tenths to approximately two-thirds interocular width, and from slightly less than four-tenths to slightly greater than four-tenths transocular width. Male pygofer with posterior margin angular posterodorsally, with many macrosetae of uniform size, without interspersed microsetae; plates abruptly narrowed in basal third; style not extending as far posteriorly as apex of connective, apex rounded. Female unknown.

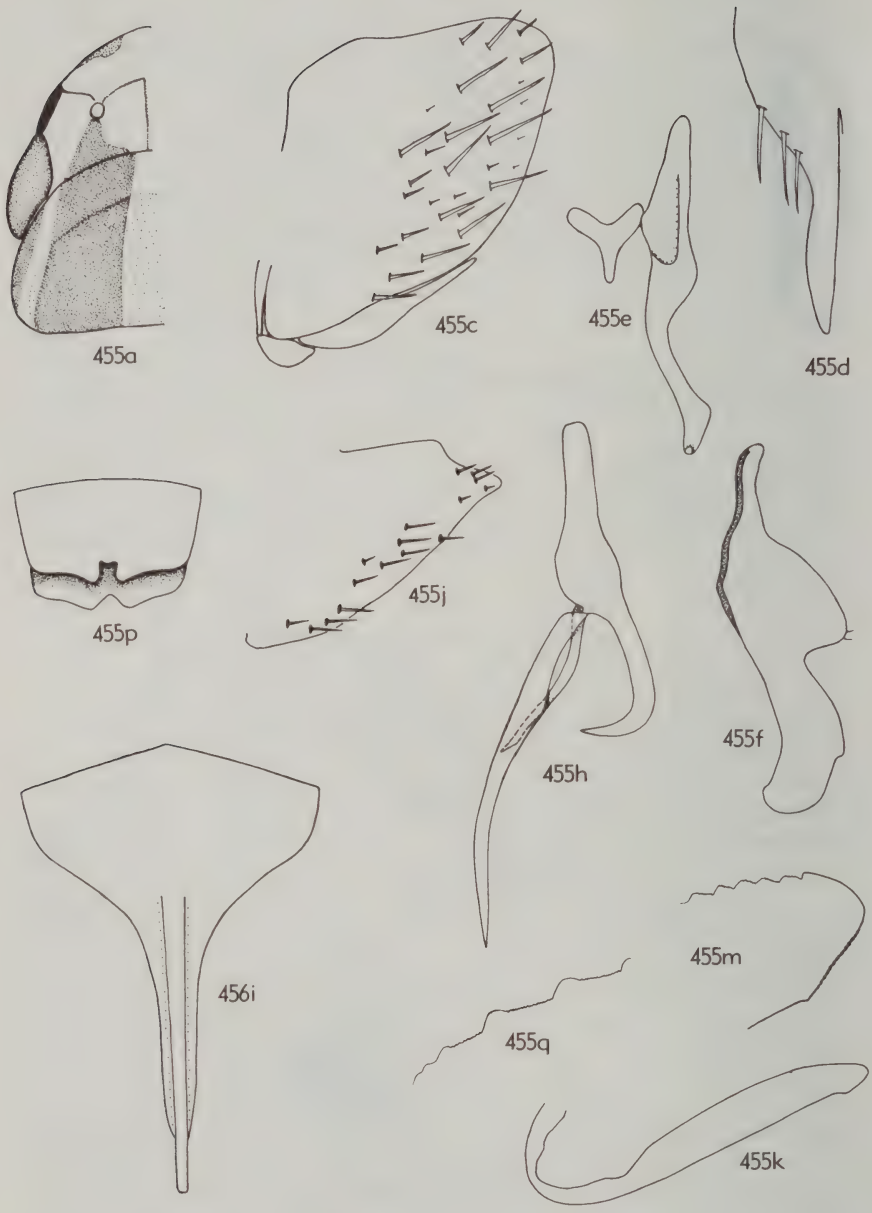
Crown marked with pale submarginal arch of greenish-yellow connected with a similarly colored median band of same width, the two lateral extremities of the arch and the median band extending posteriorly over pronotum to its apex, the median one continuing to scutellar apex, the lateral ones extending onto forewings and attaining claval apex, commissural margin of basal two-thirds of clavus narrowly yellow; corium with a slender oblique mark opposite apical half of clavus and a similarly slender oval mark in apex of outer anteapical cell, ivory to pink, with a slender transverse lobate ivory spot extending from costal margin into base of outer apical cell, ground color of forewings black; face and thoracic pleura black, legs stramineous.

Holotype and two additional males, Batatal, Bolivar, Colombia, 1938-1939 (M. Althen-Dahl) (ZIL). One male, Bogotá, Colombia (Lindig) (RMS).

B. doriona, n. sp., may be separated externally from other species of the genus by the more extensive pale median coronal marking which is confluent with the anterior submarginal pale arch in *doriona*, whereas the arch is completely bordered posteriorly with black in other species where it occurs.



FIGURES 452-454.—452, *Beirneola doriona*, n. sp., holotype (*h* from lateral view). 453, *B. carissima* (Fowler), lectotype (*h* from lateral view). 454, *B. albiceps* (Fowler), lectotype.



FIGURES 455, 456.—455, *Beirneola pensilis*, n. sp. (*j, k, m, p, q*, from topotype; remainder from holotype; *h*, from dorsal view): *p*, Female abdominal sterna VI and VII, from ventral view; *q*, teeth at base of toothed portion of second valvula. 456, *B. alboparallela* (Signoret), lectotype.

Beirneola pensilis, NEW SPECIES

FIGURE 455, PAGE 554

Length of male 5.9 mm, of female 5.6-6.0 mm. Head with median length of crown varying from slightly less than six-tenths to slightly more than six-tenths interocular width and from slightly more than one-third to four-tenths transocular width, crown with a transverse concavity across ocelli. Male pygofer with a number of microsetae dispersed among the macrosetae; style extending posteriorly much beyond apex of connective, apical portion with a convexity near apex on outer margin, apex acute and reflexed; aedeagus with apex convex or nearly so; paraphyses with three asymmetrical, slender, acute rami arising from same position on stalk. Female with abdominal sternum VI overlapping base of VII and with a median quadrate apical notch, sternum VII angularly notched at apex, both of these sterna short; genital chamber with a conspicuous median semi-oval sclerite; second valvulae with teeth much more widely spaced near base than near apex; setae of female pygofer not uniformly spaced.

Color of crown ivory with a pair of marginal arcs, one on each side of apex and a triangular area behind each ocellus and touching basal margin, brown, a darker line on dorsal margin of antennal ledge; pronotum with ground color basally and laterally as on crown, disk suffused with darker color, with two broad longitudinal vittae across disk and lateral margins narrowly, brown, the broad vittae continued onto yellow scutellum to form its brown basal angles; forewings reddish-black to purple with an inconspicuous pale diagonal area in clavus and two in corium, areoles of some of anteapical and apical cells (variable in number), paler; face brown; thoracic venter and legs yellow.

Holotype and nine additional males, and eight females, San Isidro del General, Costa Rica (NCS). Holotype on indefinite loan to USNM.

B. pensilis, n. sp., is very similar in appearance, and in the male genitalia, to *B. albiceps* (Fowler), but can be separated readily from the latter by the modified sixth sternum of the female in *pensilis.*

73. FUSIGONALIA, NEW GENUS

FIGURES 457-467

Type-species: *Tettigonia lativittata* Fowler.

Length of male 4.5-7.9 mm, of female 5.2-6.9 mm.

Head moderately produced, anterior margin broadly rounded in dorsal view, median length of crown varying from one-half to more than eight-tenths interocular width, and from one-third to more than one-half transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each ocellus slightly closer to median line than to adjacent anterior eye angle, entire disk of crown usually broadly and shallowly concave, without a median fovea and without sculpturing, without setae; lateral clypeal sutures extending onto crown and usually attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins

oblique and varying from rectilinear to slightly convex; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side, clypeus not or only slightly flattened medially, muscle impressions usually not distinct, transclypeal suture obsolete at middle, clypellus with contour usually continuing profile of clypeus or at most with its lower portion only slightly more nearly horizontal than its upper portion.

Thorax with pronotal width equal to, less than, or greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carina complete, posterior margin slightly concave, disk without sculpturing or pubescence, scutellum weakly transversely striate behind transverse sulcus. Forewing becoming gradually membranous apically, the membranous area variable intraspecifically in extent, with three closed anteapical cells (outermost often indistinct), of which the bases of the outer two are much more proximal than base of inner anteapical cell, with four apical cells (outermost often indistinct), the base of the fourth, when discernible, usually slightly more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterodorsal margin (apex) strongly convex, with numerous macrosetae on posterior half, pygofer processes usually absent (ventral pygofer processes occur in an undescribed species). Plates slender, triangular, usually extending posteriorly as far as, or farther than, pygofer apex, each bearing a number of macrosetae that are usually in a single longitudinal row. Style extending posteriorly at least as far as, usually farther than, connective, apex variable interspecifically, style without a preapical lobe. Aedeagus moderately long, with or without processes (varying interspecifically). Paraphyses present in most species, variable interspecifically.

Female abdominal sternum VII moderately produced and tapered posteriorly to a narrowly rounded or acutangular apex. Genital chamber without sclerites. Ovipositor with second valvula broadened in most of length beyond basal curvature and bearing widely-spaced teeth near basal part of expanded portion, and intervening numerous small denticles, the teeth closer and bearing secondary denticles in apical part, apex narrowly rounded and with minute anteapical dorsal and ventral denticles. Pygofer with a number of macrosetae arranged irregularly posterodorsally.

Species of *Fusigonalia* have a median dorsal fusiform black stripe extending from apex of crown to apex of clavus (with wings at rest), and additional black markings. The basal angles of the scutellum, a claval vitta tapering apically and a corial vitta tapering basally, are yellow or olive. A narrow yellow transverse band of varying extent occurs in the area of the apical cells.

Fusigonalia occurs from southern Mexico to Bolivia. The genus is close to *Juliaca* Melichar, but none of the species of the latter have a median black vitta on the anterior dorsum.

Two specimens of *F. epacra,* n. sp., were collected on *Vernonia* sp., but nothing else is known about the biology of the species.

My interpretation of *Tettigonia lativittata* Fowler is based on a study of the male lectotype, of which the genitalia were as in the present illustration. The species I have interpreted as *Tettigonia obtecta* Signoret is based on an examination, but not a dissection, of the male lectotype. The holotype of *Tettigonia quinquevittata* Taschenberg is without an abdomen. The head and pronotum are similar to those of the specimen illustrated here (fig. 459*a*).

SPECIES OF *FUSIGONALIA*

caucaensis, n. sp. Colombia.
decurvata, n. sp. Panama.
epacra, n. sp. Trinidad, Venezuela.
lativittata (Fowler), 1900d:281 *(Tettigonia).* S. Mexico, Guatemala, Costa Rica, Panama. New combination.
melanota, n. sp. Colombia.
metaensis, n. sp. Colombia.
obtecta (Signoret), 1855d:798 *(Tettigonia).* N. Brazil, Peru, Bolivia. New combination.
optata, n. sp. Peru, Bolivia.
pachaca, n. sp. Peru, Bolivia.
quinquevittata (Taschenberg), 1884a:447 *(Tettigonia).* Colombia, New combination.
yapacapa, n. sp. Bolivia.

KEY TO MALES OF *FUSIGONALIA*

1. Pronotum with a pair of longitudinal pale (usually yellow) vittae extending throughout its length 2
   Pronotum without longitudinal pale markings, or if present then usually not extending full length ..... *melanota,* n. sp., page 559

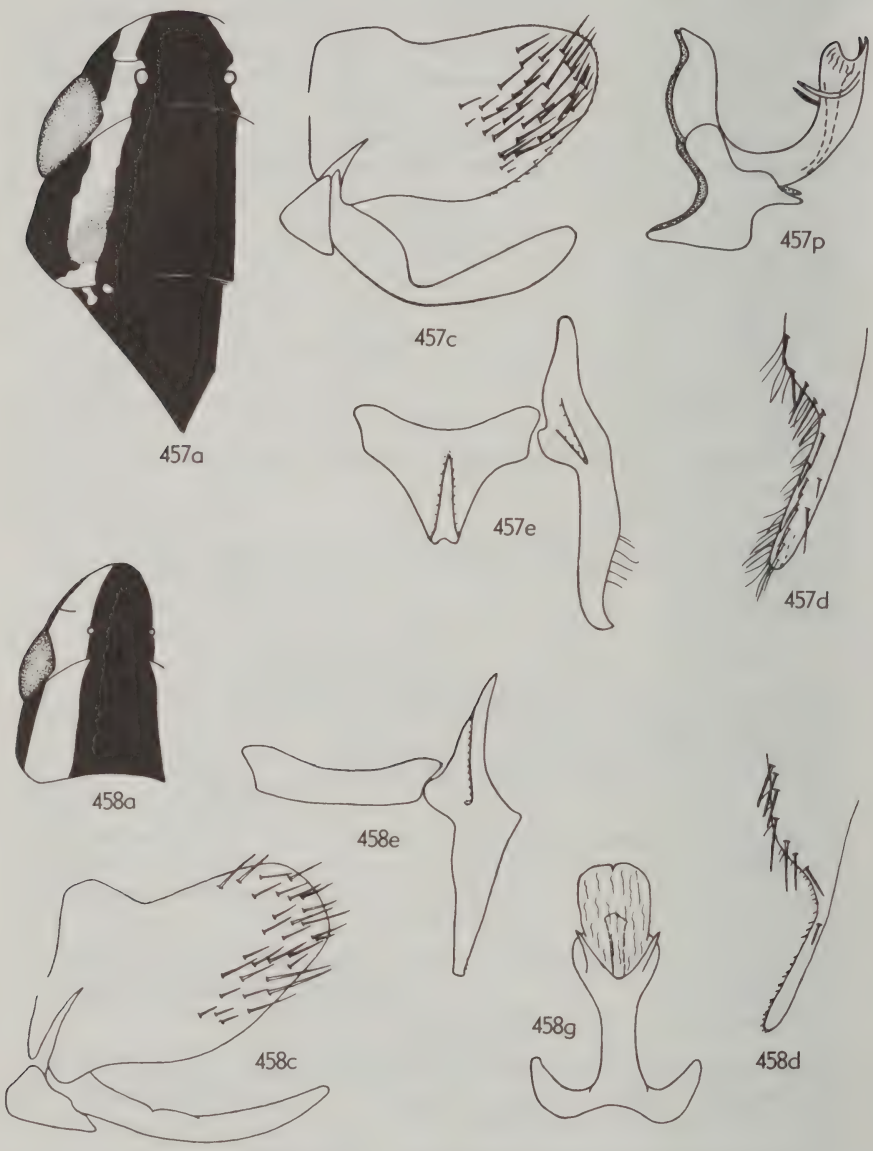
2. Aedeagus without paraphyses, with short lateroventral processes near midlength ..... *optata,* n. sp., page 560
   Aedeagus with paraphyses, or with an extra piece at apex of connective, before shaft 3

3. Aedeagal shaft with a pair of slender decurved or recurved anteapical processes ..... *quinquevittata* (Taschenberg) (fig. 459)
   Aedeagal shaft without such processes 4

4. Genitalia with a short basal sclerite between apex of connective and base of aedeagus ..... *obtecta* (Signoret) (fig. 460)
   Genitalia without such a sclerite 5

5. Paraphyses crossed near their bases in ventral view *pachaca,* n. sp., page 560
   Paraphyses not crossed basally 6

6. Paraphyses with each arm forked 7
   Paraphyses with arms not forked 8



FIGURES 457, 458.—457, *Fusigonalia melanota*, n. sp. (from specimen from Colombia): *p*, Aedeagus and paraphyses, from lateral view. 458, *F. optata*, n. sp., holotype.

7. Paraphyses with extremities widely separated in caudoventral view, aedeagal shaft without processes ..... *decurvata,* n. sp., page 563
Paraphyses with extremities appearing as lobes not widely separated in caudoventral view, aedeagal shaft with a pair of slender elongate processes arising before midlength ..... *epacra,* n. sp., page 564

8. Aedeagus with a pair of short slender processes arising basidorsally, extending parallel to shaft ..... *caucaensis,* n. sp., page 565
Aedeagus without shaft processes 9

9. Forewing with inner yellow stripe of corium arising near wing base .. 10
Forewing with inner yellow stripe of corium arising oposite midclavus *yapacapa,* n. sp., page 567

10. Aedeagal shaft in caudoventral view with a pair of lateral expansions anteapically, the apical portion of shaft appearing bluntly sagittate *metaensis,* n. sp., page 567
Aedeagal shaft not expanded anteapically ... *lativittata* (Fowler) (fig. 467)

Fusigonalia melanota, NEW SPECIES

FIGURE 457, PAGE 558

Length of male 6.0 mm, of female 6.5-6.9 mm. Head with median length of crown varying from slightly more than one-half to slightly more than six-tenths interocular width and from one-third to slightly less than four-tenths transocular width, antennal ledges in lateral view with anterior margins convex. Thorax with pronotal width greater than transocular width of head. Male plates each with macrosetae biseriate in apical half; style extending posteriorly farther than connective, subtruncate apically; aedeagus curved smoothly dorsally, with a pair of slender longer anteapical processes extending laterally then curved dorsally, and a pair of slender shorter apicoventral processes extending apically and slightly laterally; paraphyses with rami short and broad.

Crown with median black vitta very broad and with lateral margins strongly convergent anteriorly, separated on each side from dark stripe before compound eye by a narrow pale yellow stripe which extends onto the otherwise completely black pronotum to an extent that varies from very slight to almost full length (type); scutellum with basal angles usually narrowly yellow (may be concealed beneath pronotum); corial yellow vitta very attenuate basally but attaining axillary sclerites or nearly so; transverse anteapical band narrow, extending into inner apical cell; face with clypeus and clypellus of male dark or black except at its lateral margins, of female pale, at most with a full-length median black stripe over clypeus and clypellus (partly wanting in some specimens), black anteocular band extending across anterior antennal ledge margin to fuse with black clypeal markings in males, to end convexly, without curving, in female, remainder of face yellow; thoracic pleura with variable proportions of yellow and black; legs yellow to pale brownish.

Holotype and five additional males and six females, Colombia, 1941 (L. Richter) (NCS). Holotype on indefinite loan to USNM from NCS.

F. melanota, n. sp., has more black on the pronotum than other species of the genus. The two pairs of processes at and near the apex of the aedeagus will serve to distinguish males of *melanota* from other species in the genus.

Fusigonalia optata, NEW SPECIES

FIGURE 458, PAGE 558

Length of male 6.3-6.7 mm, female unknown. Head with median length of crown varying from seven-tenths to approximately eight-tenths interocular width and from slightly more than four-tenths to one-half transocular width, antennal ledges in lateral view with anterior margins convex or rectilinear. Thorax with pronotal width equal to or greater than transocular width of head. Male plates with uniseriate macrosetae; style extending posteriorly much farther than connective, which is merely a transverse bar, style tapered and truncate at apex; aedeagus curved smoothly dorsally, with a pair of short, slender, acute processes arising ventrally on shaft beyond its midlength, extending almost parallel to shaft; paraphyses absent.

Crown with median black vitta not as broad as in *F. melanota,* n. sp. (above), its lateral margins strongly convergent anteriorly, the median vitta at posterior margin of head with width less than the combined adjacent widths of yellow vittae which separate it from the anteocular black vitta on each side; the yellow vittae extending posteriorly over pronotum to include basal scutellar angles and to unite with yellow claval vitta (see generic description); corial yellow vitta not extending anteriorly nearly as far as axillary sclerites; transverse anteapical band interrupted, consisting of two spots, midcostal marking amber; face with black anteocular band extending across anterior margin of antennal ledge and tapering to a point; remainder of face, venter, and legs, pale yellow, dorsal portion of thoracic pleura black and continuous with black lateral pronotal margin.

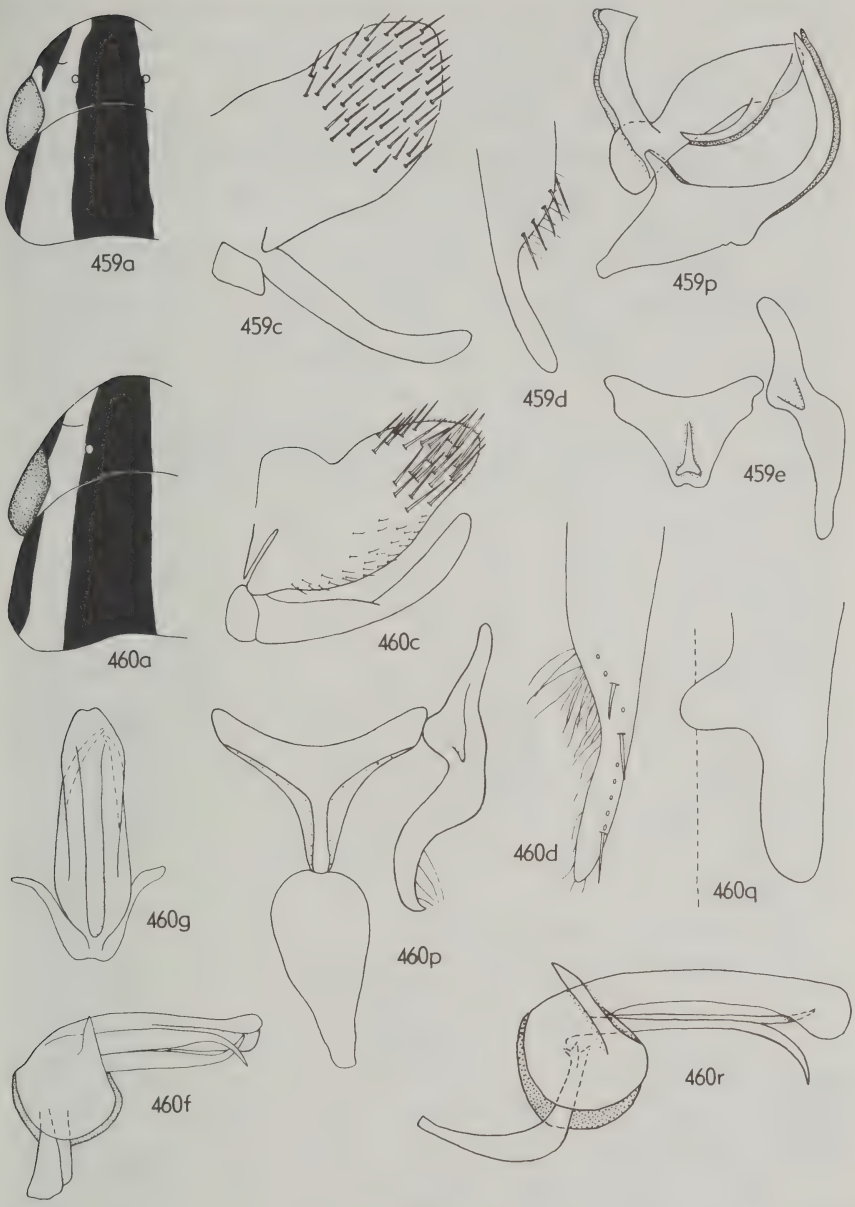
Holotype male, Rurrenabaque, Beni, Bolivia (W. M. Mann), Mulford Biological Exploration, 1921-22, and a pair of specimens *in copula*, Callanga, Peru (USNM). Five males, Chanchamayo, Peru, July 22, 1960 (C. Ramirez); one male, same data, except collector (J. Salazar) (NCS). One male, 10 mi. southwest of Las Palmas, Huánuco, Peru, 1,000 m., September 17, 1954 (E. I. Schlinger and E. S. Ross); and one male, Monsón Valley, Tingo María, Peru, October 26, 1954 (same collectors) (CAS).

F. optata differs from all other species in the genus in its lack of paraphyses. The form of the aedeagus of the male is also distinctive.

Fusigonalia pachaca, NEW SPECIES

FIGURE 461, PAGE 562

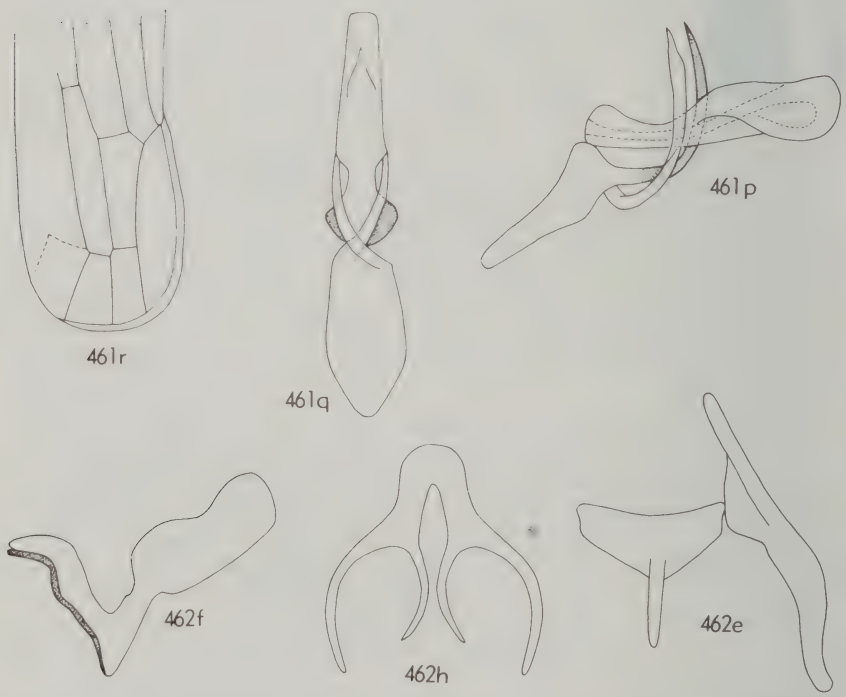
Length of male 6.6-7.3 mm. Head with median length of crown varying from slightly less than one-half to slightly more than one-half interocular



FIGURES 459, 460.—459, *Fusigonalia quinquevittata* (Taschenberg) (from specimen from Colombia): *p*, Aedeagus and paraphyses, from lateral view. 460, *F. obtecta* (Signoret) (*r* from specimen from Rioja, Peru; remainder from Itaituba, Brazil): *p*, Style, connective, and paraphysis, from dorsal view; *q*, male pygofer apex, left side, from ventral view; *r*, aedeagus from lateral view.

width and from three-tenths to almost one-third transocular width, antennal ledges in lateral view with anterior margins rectilinear or slightly convex. Thorax with pronotal width greater than transocular width of head. Male plates with uniseriate macrosetae; style extending posteriorly much farther than apex of connective, narrowly rounded at apex; aedeagus extending posterodorsally, only slightly curved, narrowest slightly beyond base in both lateral and ventral views, without processes; paraphyses with rami slender and tapering, crossed near base, curved dorsally.

Crown with median black vitta very broad and with lateral margins convergent anteriorly, the median vitta at posterior margin of head with width approximately equal to the combined widths of yellow vittae which separate it from the anteocular black vitta on each side; the yellow vittae extending posteriorly as in *F. optata*, n. sp. (above); corial yellow vitta not extending as far anteriorly as axillary sclerites, but with its anterior end opposite midlength of scutellum (with wing in repose); transverse apical band not interrupted, extending from costal margin into inner apical cell, midcostal marking absent or amber; face varying from entirely black to pale except clypeus and



FIGURES 461, 462.—461, *Fusigonalia pachaca*, n. sp. (*p*, *q*, from specimen from Yungas de la Paz, Bolivia; *r* from Monsón Valley, Peru): *p*, Aedeagus and paraphyses, from lateral view; *q*, the same, from ventral view; *r*, forewing apex. 462, *F. decurvata*, n. sp., holotype; (*h* from caudoventral view).

clypellus which are entirely black except near their lateral limits (holotype); pleura of pro- and mesothorax, mesosternum, apices of tarsi, and male plates, black, remainder of venter and legs pale.

Holotype male, Chanchamayo, Peru, July 22, 1960 (J. Salazar) (NCS). Seventeen males, Monsón Valley, Tingo María, Peru, December 9, 1954 (E. I. Schlinger and E. S. Ross) (CAS). Three males, Yungas de Palmar, Bolivia, 100 m., November 1960 (A. Martínez) (SSM).

F. pachaca, n. sp., differs from other species in the genus in the crossed paraphyses. The form of the aedeagus is similar to that of *F. lativittata* (Fowler), but narrower and not distinctly bisinuate as in the Fowler species.

Fusigonalia decurvata, NEW SPECIES

FIGURE 462, PAGE 562

Length of male 5.4-5.5 mm, of female 5.7-5.8 mm. Head with median length of crown varying from six-tenths to slightly more than three-fourths interocular width, and from slightly more than one-third to slightly more than four-tenths transocular width, antennal ledges in lateral view with anterior margins convex. Thorax with pronotal width greater than transocular width of head. Male plates each with macrosetae uniseriate; style extending posteriorly farther than connective, narrowly rounded at apex; aedeagus extending caudodorsally, shaft abruptly broadened in basal half in lateral view, the broadened portion with a weak concavity in dorsal marginal midlength, apex very broadly and very slightly convex; paraphyses with each of the two rami broadly branched and appearing C-shaped in caudoventral view.

Crown with median black vitta not as broad as in *F. melanota,* n. sp. (above), its lateral margins subparallel except at apex, the median vitta at posterior margin of head with width much less than combined widths of yellow vittae which separate it from the anteocular black vitta on each side; the pale vittae extending posteriorly over pronotum, becoming green or greenish on posterior part of pronotum, to include yellow basal scutellar angles and to unite with pale claval vitta which is green; corial vitta green or greenish-yellow and extending anteriorly almost as far as axillary sclerites; transverse anteapical band not interrupted, extending from costal margin into inner apical cell, midcostal marking amber or lacking; median vitta narrower along claval commissure than in other species of *Fusigonalia,* and the claval pale vitta correspondingly wider; face with black anteocular band extending ventrally along anterior margins of antennal ledges and continuing ventrally on clypeus about half distance to transclypeal sulcus; remainder of face, pleura and venter pale except a black area on proepimeron below dorsopleural carina and additional black areas on mesothorax.

Holotype and three additional males, 5 m. north of Volcán, Panama, December 6, 1952 (F. S. Blanton); two males and one female, Mojinga Swamp, Panama CZ, September 1, 1953 (F. S. Blanton) (all in USNM).

F. decurvata, n. sp., differs markedly from other species of *Fusigonalia* in the narrower claval portion of the fusiform vitta, the greenish tint of the claval and corial pale vittae, and in the form of the paraphyses of the male.

Fusigonalia epacra, NEW SPECIES

FIGURE 463

Length of male 4.6-4.7 mm, of female 5.2-5.5 mm. Head with median length of crown varying from seven-tenths to slightly more than eight-tenths interocular width and slightly more than four-tenths to one-half transocular width, antennal ledges in lateral view with anterior margins convex. Thorax with pronotal width equal to or less than transocular with of head. Male plates with uniseriate macrosetae; style extending posteriorly much farther than apex of connective which is short T-shaped, style narrowly rounded at apex; aedeagus curved very slightly dorsally in lateral view, with a pair of slender tapering shaft processes arising near base, variable in length, in some

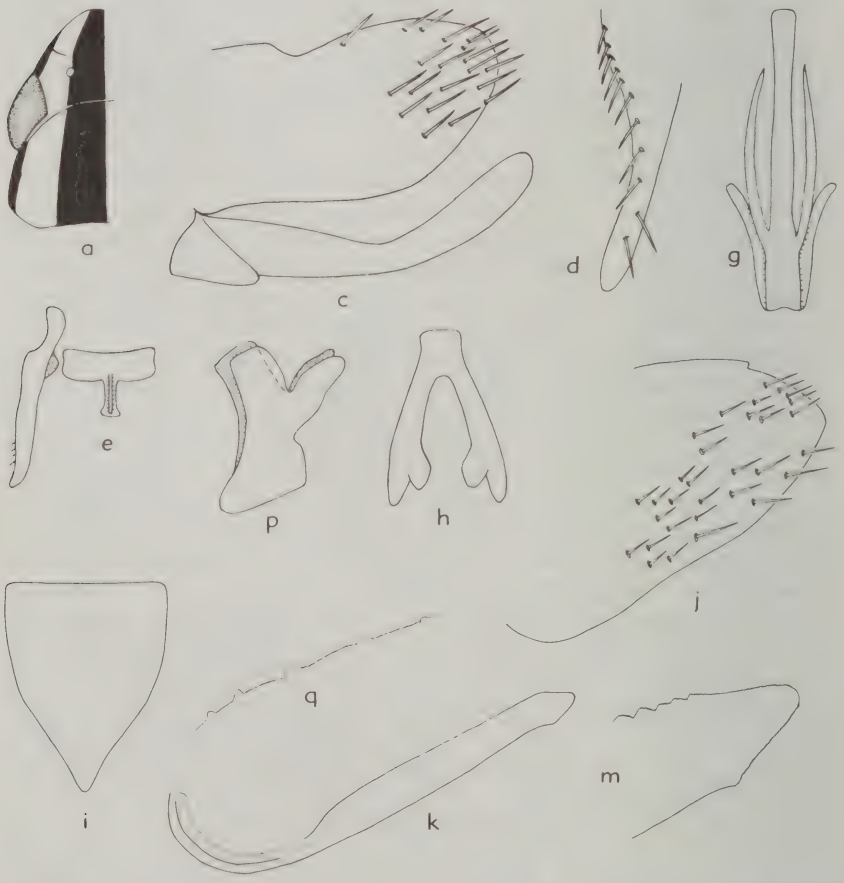


FIGURE 463.—*Fusigonalia epacra*, n. sp. (*i-k, m, q*, from specimen from San Estebán, Venezuela; remainder from Maracay, Venezuela; *h* from caudo-ventral view): *p*, Paraphyses from lateral view; *q*, basalmost teeth of second valvula.

specimens exceeding apex of aedeagus; paraphyses consisting of a very short basal unpaired portion and two arms each of which is once-branched, the branches being very short and broad.

Crown with lateral margins of median black vitta strongly convergent anteriorly, the median vitta at posterior margin of head with width approximately equal to combined widths of yellow vittae which separate it from the anteocular black vitta on each side; the pale vittae extending posteriorly over pronotum, often becoming pale green on posterior portion of pronotum, to include basal scutellar angles and to unite with claval vitta (see generic description) which may be yellow or green; corial pale (yellow or green) vitta not extending anteriorly as far as axillary sclerites; transverse anteapical band usually not interrupted, extending from costal margin into inner apical cell, midcostal area amber; face with black anteocular band usually extending across anterior margin of antennal ledge and becoming evanescent; face, venter, and legs, yellow, dorsal portion of thoracic pleura black and continuous with black lateral pronotal band.

Holotype and one additional male and one female, Rancho Grande, Aragua, Venezuela, March 5, 1939 (C. H. Ballou); one male and one female, same locality, 1100 m., July 11 and July 12, 1968 (J. Maldonado Capriles); one female, same locality, August 22-31, 1967, 1100 m. (R. W. Poole); one male and two females, same locality, 1100 m., February 15, 1969 (P. and P. Spangler); two males and one female, San Estebán, Venezuela, November 22-30, 1939 (P. Anduze); two males and two females, on *Vernonia* sp., 20 km., Petare-Sta. Lucía [Road?], Venezuela, April 13, 1969 (C. H. Ballou) (all USNM). One male and one specimen without abdomen, Rancho Grande, Aragua, National Park, Venezuela, 1100 m., March 4, 1967 (Henry Pittier and M. E. Irwin) (Riverside). Eight males and three females, Rancho Grande, Venezuela, March 24, 25, 27 and 28, 1946 (Bronz Zoo).

The slender aedeagus, in lateral view, with its processes, and the short distinctive paraphyses will separate *F. epacra*, n. sp., from other species in the genus.

Fusigonalia caucaensis, NEW SPECIES

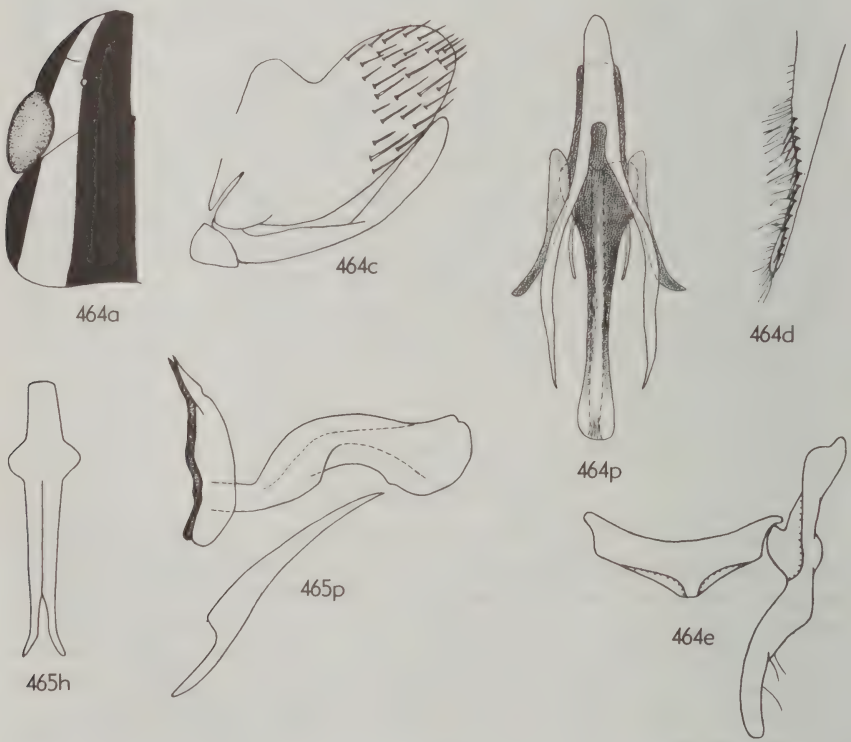
FIGURE 464, PAGE 566

Length of male 7.0 mm, female unknown. Head with median length of crown approximately seven-tenths interocular width and slightly less than one-half transocular width, antennal ledges in lateral view with anterior margins convex. Thorax with pronotal width less than transocular width of head. Male plates more slender than usual in genus and with uniseriate macrosetae; style extending posteriorly much farther than connective, which is very short Y-shaped, style narrowly rounded at apex; aedeagus slender and bisinuous in lateral view, extending posteriorly, with a pair of short slender tapering processes arising above bases of dorsal apodemes and extending parallel to shaft. Paraphyses with rami slender, elongate, extending posteriorly almost as far as apex of shaft.

Crown with median black vitta very broad, its lateral margins strongly convergent anteriorly, the median vitta at posterior margin of head with width greater than combined adjacent widths of yellow vittae which separate it from the anteocular black vitta on each side; the yellow vittae extending posteriorly over pronotum to include basal scutellar angles and to unite with yellow claval vitta (see generic description); corial yellow vitta interrupted anteapically, not extending forward as far as a point opposite scutellar apex; transverse anteapical band narrow, interrupted, consisting of two linear segments, midcostal marking amber; face with black anteocular band extending across anterior margin of antennal ledge and along margin between crown and face almost to apex of head, tapering, acute apically; pleura of pro- and mesothorax, mesosternum, apices of tarsi, and abdominal venter, black.

Holotype and one additional male, Cauca, Colombia, 1900 m. "4-10-48" (Pfaff) (USNM).

F. caucaensis, n. sp., is similar, in the structure of the male genitalia, to *F. epacra*, n. sp. (above), but the shape of the aedeagus (bisinuous and directed



FIGURES 464, 465.—464, *Fusigonalia caucaensis*, n. sp., holotype: *p*, Paraphyses and aedeagus, from ventral view. 465, *F. yapacapa*, n. sp., holotype (*h* from caudoventral view): *p*, Paraphyses and aedeagus, from lateral view.

posteriorly) differs from *epacra* (smoothly curved dorsally). The paraphyses differ greatly in length in the two species, those of *epacra* being short. The anteocular black line extends farther forward in *caucaensis* than in other species of the genus.

Fusigonalia yapacapa, NEW SPECIES

FIGURE 465, PAGE 566

Length of male 5.1-5.5 mm, of female 5.6-6.0 mm. Head with median length of crown varying from slightly more than three-fourths to eight-tenths interocular width and from slightly less than one-half to slightly more than one-half transocular width, antennal ledges in lateral view with anterior margins convex. Thorax with pronotal width approximately equal to transocular width of head. Male plates with uniseriate macrosetae; style extending posteriorly approximately as far as apex of connective, narrowly rounded at apex; connective Y-shaped; aedeagus in lateral view abruptly broadened just posterior to base, extending posterodorsally and slightly bisinuate, apex slightly broader and broadly convex, shaft without processes; paraphyses with a short basal unpaired portion, rami contiguous, extending dorsally, their apices slender, tapering, slightly divergent.

Crown with median black vitta not unusually broad for genus, its lateral margins slightly convergent anteriorly, the median vitta at posterior margin of head with width approximately equal to combined adjacent widths of yellow vittae which separate it from the anteocular black vitta on each side; the yellow vittae extending posteriorly over pronotum to include basal scutellar angles and to unite with yellow claval vitta (see generic description); corial yellow vitta not extending anteriorly very far into anterior half of wing; transverse anteapical band extending to outer margin of inner apical cell, midcostal marking weak, amber; face with black anteocular band extending across anterior margin of antennal ledge and tapering to a point; remainder of face, venter, and legs, pale yellow, dorsal portion of thoracic pleura black and continuous with black lateral pronotal margin.

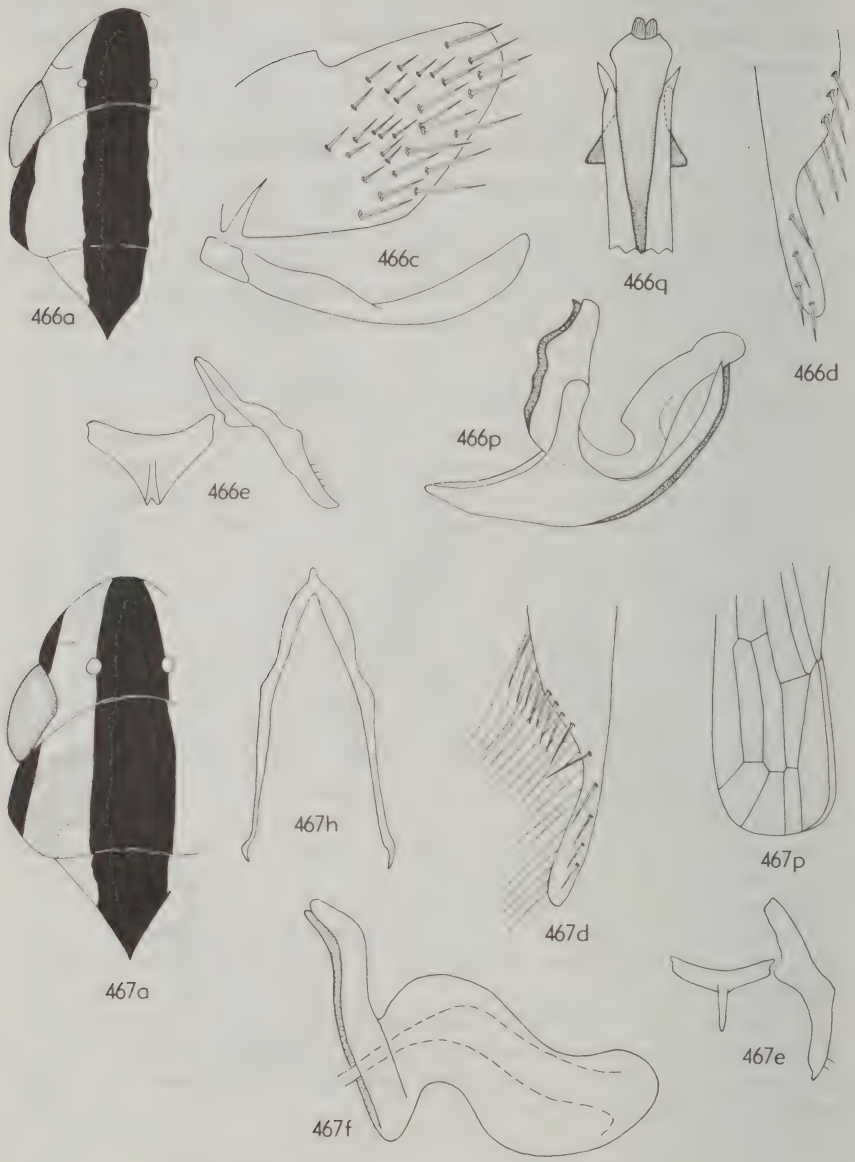
Holotype male and twenty-six additional specimens representing both sexes, Santa Cruz, Bolivia (J. Steinbach) (MCZ); and one male, Las Juntas, Bolivia (Steinbach) (CM).

F. yapacapa, n. sp., is similar in many respects to *F. lativittata* (Fowler), from which it may be easily separated by the form of the paraphyses (fig. 465*h*) of the male, and externally by the corial pale vitta which extends more anteriorly in *lativittata*.

Fusigonalia metaensis, NEW SPECIES

FIGURE 466, PAGE 568

Length of male 5.8 mm, female unknown. Head with median length of crown approximately seven-tenths interocular width and more than four-tenths transocular width, antennal ledges in lateral view with anterior margins



FIGURES 466, 467.—466, *Fusigonalia metaensis*, n. sp., holotype: *p*, Aedeagus and paraphyses, from lateral view; *q*, the same, apical portion only, from caudal view. 467, *F. lativittata* (Fowler) (from specimen from San Isidro del General, Costa Rica; *h* from ventral view): *p*, Apical portion of forewing.

rectilinear. Thorax with pronotal width approximately equal to transocular width of head. Male plates with uniseriate macrosetae; style extending posteriorly slightly farther than apex of connective which is broadly triangular, style narrowly rounded at apex; aedeagus curved abruptly dorsally near base of shaft, thence extending posterodorsally, broadened anteapically in caudal view, the apex appearing somewhat sagittate in ventral view; paraphyses slender, tapering, in lateral view curving gradually dorsally, acute apically, in caudal view with the rami not widely divergent.

Crown with median black vitta with lateral margins not convergent until just behind apex, the median vitta at posterior margin of head with width less than combined adjacent widths of yellow vittae on each side, without an anteocular black vitta on each side; the yellow vittae extending posteriorly over the pronotum to include basal scutellar angles and to unite with greenish-yellow claval vitta (see generic description); corial vitta yellowish-green, extending basally as far as axillary sclerites; transverse anteapical band entire, extending from costal margin into inner apical cell, midcostal marking not distinct; face, venter, legs, and pleura, yellow, except a narrow band bordering dorsopleural carina and continuous with lateral pronotal black stripe.

Holotype male, 3 m. west of Villavicencio, Meta, Colombia, 920 m., March 11, 1955 (E. I. Schlinger and E. S. Ross) (CAS). One specimen without abdomen, Río Negro, finca near Villavicencio, Colombia, February 5, 1969 (R. E. Dietz IV) (USNM).

F. metaensis, n. sp., is similar to *F. quinquevittata* (Taschenberg) in the structure of the male genitalia, but differs in that the aedeagus is curved dorsally in *metaensis*. None of the other species of *Fusigonalia* lack the short anteocular black vitta.

74. Genus CICADELLA Latreille

Figure 468

Cicadella Latreille, 1817a:406. Type-species: *Cicada viridis* Linnaeus, by subsequent designation of Van Duzee, 1916a:66.

Cicadella Latreille, International Commission of Zoological Nomenclature, Opinion 647 (see Part 1 of present work, "Literature Cited") (name placed on Official List of Generic Names in Zoology).

Length of male 6.5-7.7 mm, of female 8.1-10.3 mm.

Head weakly produced with anterior margin broadly rounded, without a carina or an angle at transition from crown to face, ocelli in line with anterior eye angles, surface convex without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, not carinate, in lateral view with their anterior margins oblique and often slightly concave; clypeus convex, muscle impressions distinct, transclypeal suture distinct, clypellus with contour usually continuing profile of clypeus or with its lower portion more nearly horizontal, with short pubescence.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae horizontal or slightly oblique, extending only over posterior portion of proepimeron, posterior margin very slightly

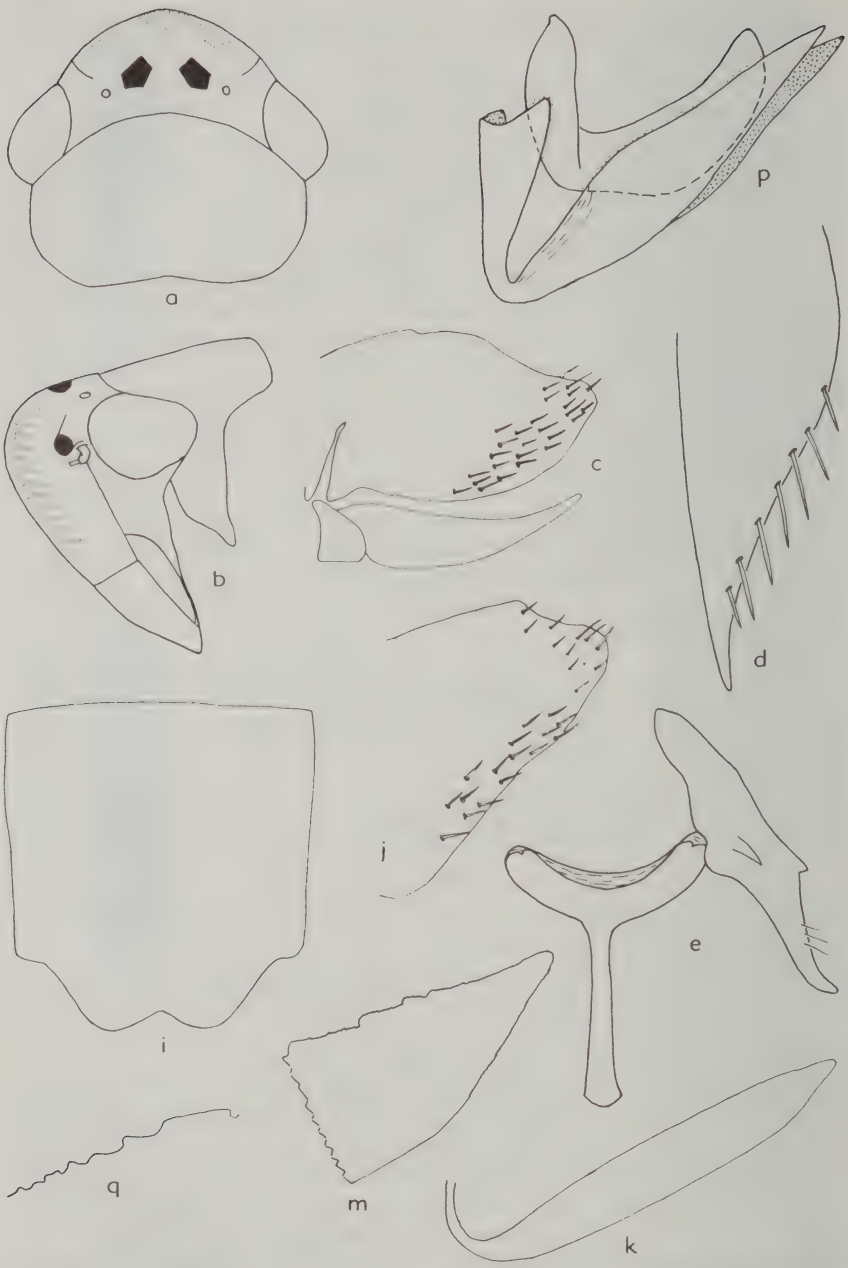


FIGURE 468.—*Cicadella viridis* (L.) (*a, b, d, e,* from specimen from Moji, Japan; remainder from Chefoo, China): *p,* Aedeagus and paraphyses, from lateral view; *q,* teeth at base of second valvula.

concave, pronotal disk transversely rugulose, not pubescent; scutellum not transversely striate behind transverse sulcus. Forewing with membrane including all of apical cells and extending proximad broadly along costal margin often almost to wing base, veins elevated, distinct, with three closed anteapical cells, of which the base of the middle one is located more proximally than base of either of the adjoining ones, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins (occasionally with one or a very few extra cross veins), texture coriaceous and transversely rugulose; forewings of female in rest position exceeding apex of ovipositor or not. Hindleg with femoral setal formula 2:1:1 or occasionally 2:1:0 or 2:1:1; length of first tarsomere approximately equal to combined length of two more distal tarsomeres, with two parallel rows of setae on plantar surface, the more proximal setae in one row of these paleate.

Male genitalia: Pygofer moderately produced, apex narrowly convex, with a number of small macrosetae located parallel to posteroventral margin, pygofer processes absent. Plates triangular, extending posteriorly as far as pygofer apex, each with a longitudinal row of macrosetae. Style not extending posteriorly as far as apex of connective, without a preapical lobe, acute apicolaterally. Connective broadly Y-shaped. Aedeagus moderately long, without processes. Paraphyses symmetrical, broad at base, rami broad in lateral view.

Female abdominal sternum VII with posterior margin broadly produced and shallowly notched medially. Genital chamber without sclerites. Ovipositor with second valvula expanded and bearing dorsal teeth almost throughout length beyond basal curvature, its ventral margin convex in the expanded portion, teeth rounded near base, with large quadrate primary teeth extending almost to narrowly convex apex, with minute secondaries on primary teeth and with minute anteapical denticulations on dorsal and posteroventral margins, without an anteapical ventral angle. Pygofer, narrowly rounded apically, with macrosetae near posterodorsal and posteroventral margins.

Cicadella viridis (L.) (1758a:438) is the only known species. It is well known and widely distributed in the Old World, having been recorded from all of Europe, Syria, Palestine, Siberia, Manchuria, Korea, China, India, Malaya, Java, Ceylon, the Ryukyu Islands, Formosa, Japan and the Philippines. A few references to the occurrence of *viridis* in Canada are probably wrong.

Cicadella, the only European genus of Cicadellinae, is very similar in structure of both male genitalia and the ovipositor of the female to the Western Hemisphere generic group that includes *Chlorogonalia,* new genus, *Draeculacephala* Ball, and *Carneocephala* Ball. A comparison of these structures in *Cicadella viridis* (L.) (fig. 468) and *Chlorogonalia coeruleovittata* (Signoret) (fig. 469), shows remarkable similarities. *Cicadella* has an incomplete dorsopleural carina on the prothorax, a characteristic very common in Old World Cicadellinae, and uncommon in New World genera of this subfamily, but it is reduced in some species of the above generic group in the New World. The occurrence of pegs in the proximal portion of one of the rows of plantar setae on the first tarsomere of the hindleg is unusual in the Cicadellinae, but it also occurs in the related genera *Draeculacephala* and *Carneocephala.*

CICADELLA GENERIC GROUP

74. Cicadella
75. Chlorogonalia
76. Draeculacephala
77. Carneocephala

69. *Plerogonalia*

78. Tylozygus

80. Plesiommata

79. Ciminius

81. Helochara
82. Syncharina
83. Helocharina

Morcos (1953a) gave an account of the biology of *Cicadella viridis* (L.) in England, reporting that there is only one generation per year, and that the eggs were laid in *Juncus effusus* L.

Frediani (1954a, 1956a - see Young, Part 1, p. 273) made a study of the variability of the chaetotaxy of the hind femur, and (1955a, see Literature Cited, below) a more complete study of the morphology and bionomics of *Cicadella viridis* (L.). In Pisa, Italy, he found three generations and a partial fourth each year. Eggs of the summer generations were laid in non-woody plants, but the eggs of the third generation were deposited in rose twigs. Frediani cites other workers who listed both herbaceous and woody plants for ovipositional sites for *viridis*. He cites Balachowsky (1941a) for evidence that *viridis* feeds on *Phragmites*, *Arundo* and *Juncus* in France and Goidanich (1938a) for evidence that sugarcane is a food plant and Servadei (1948a) for evidence that *viridis* feeds on cultivated and wild grasses. Frediani himself found *Agropyron repens* (L.) to be a food plant.

SPECIES OF *CICADELLA*

(I have not seen types of any of the following nominal species)

viridis (Linnaeus), 1758a:438 *(Cicada)*. See text for distribution.
arundinis (Germar), 1821a:71 *(Tettigonia)*.
melanchloa (Walker), 1851b:778 *(Tettigonia)*.
flavicatella (DeGraaf), 1854a:183 *(Tettigonia)*.
concolor (Haupt), 1912a:184 *(Tettigonia)*.

75. CHLOROGONALIA, NEW GENUS

FIGURES 469-473

Type-species: *Tettigonia coeruleovittata* Signoret.

Length 4.5-9.6 mm.

Head slightly to well produced (variable interspecifically), median length of crown varying from slightly less than one-half to almost nine-tenths interocular width, and from slightly more than one-fourth to slightly more than one-half transocular width, anterior margin varying from broadly rounded to subangulate in dorsal view, margin not angular at transition from crown to face, ocelli located before or slightly behind a line between anterior eye angles and each slightly closer to adjacent anterior eye angle than to median line of crown, surface convex or concave anteapically (variable interspecifically), weakly punctate, finely granular, or smooth, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, not carinate dorsally, their anterior margins vertical or oblique in lateral view and varying from concave through rectilinear to convex; face in profile with clypeus slightly flattened, clypellus with contour continuing profile of clypeus except apical portion which is slightly more nearly horizontal, face without pubescence; transclypeal suture obsolete medially.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae absent, complete or incomplete, posterior margin slightly concave, disk smooth or transversely rugulose, without pubescence; scutellum weaky transversely rugulose or not. Forewing usually with membrane including all, or all except small basal portion (*C. tharma,* n. sp.) of apical cells, and extending basally along costal margin beyond base of outer apical cell to or slightly proximal of base of outer anteapical cell, veins elevated and distinct, or not, with four apical cells and base of fourth located more proximally than base of third, without an anteapical plexus of veins, texture coriaceous (exception: *C. delongi,* n. sp.) except for membrane described above; forewings of female at rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length approximately equal to (*C. losoplanensis* (Schröder)) or greater than combined length of two more distal tarsomeres.

Male pygofer moderately produced posteriorly and narrowly rounded posterodorsally, usually with a few anteapical posterodorsal macrosetae (macrosetae more numerous, occurring parallel to posteroventral and apical half of dorsal margins, and with a few near middle of disk in *tharma,* n. sp.), without processes. Plates separate throughout their length, their apices weakly sclerotized (except in *tharma*), extending posteriorly a varying distance (interspecifically) compared with pygofer apex, each slender, elongate, triangular and with a row of fairly stout macrosetae along lateral margin and extending almost to apex. Style extending posteriorly as far or almost as far as apex of connective, with or without preapical lobe, apex truncate or obliquely truncate. Connective broadly Y-shaped with stem as long as or longer than arms, keeled. Aedeagus symmetrical, without processes. Paraphyses present, paired, symmetrical, variable interspecifically at their bases.

Female (unknown in *tharma*) abdominal sternum VII with middle portion of posterior margin produced posteriorly to a varying (interspecifically) degree and slightly emarginate. Genital chamber without sclerites. Second valvulae with teeth as in genus *Cicadella* Latreille (above). Pygofer with numerous multiseriate macrosetae parallel to posteroventral margin from near its base to posterodorsal margin.

Specimens of *Chlorogonalia,* new genus, are green, except *delongi,* n. sp., with crown, anterior margin of pronotum and all of scutellum yellow, the crown with median black markings. The forewings are beautifully marked with longitudinal blue or bluish-green stripes in most specimens of *C. coeruleovittata* (Signoret).

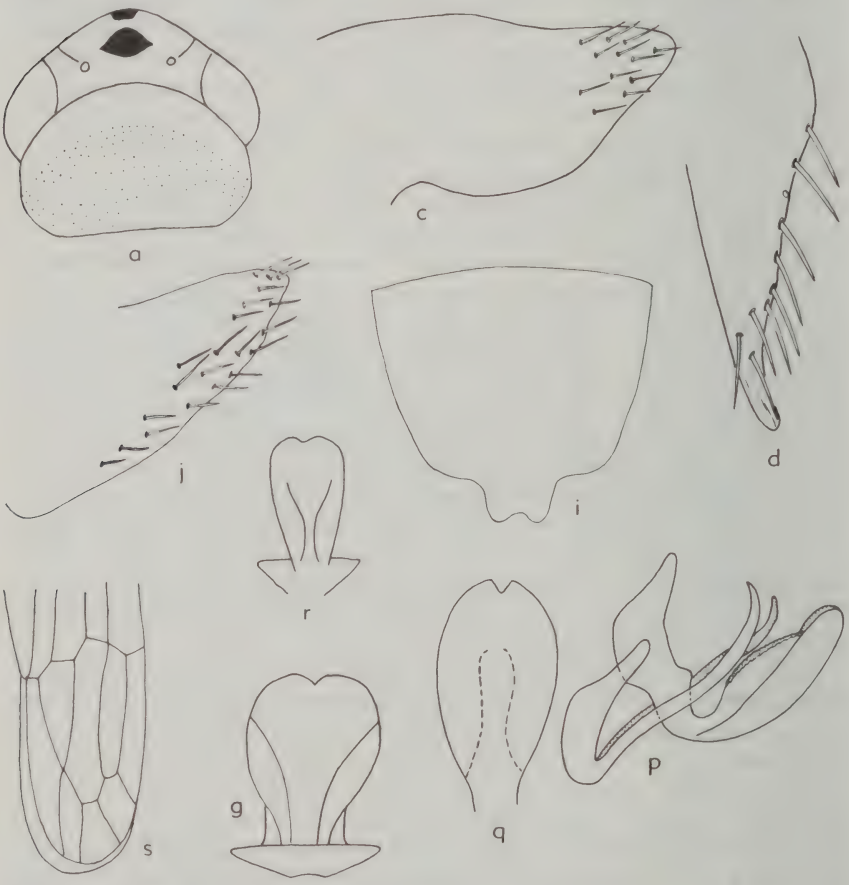


FIGURE 469.—*Chlorogonalia coeruleovittata* (Signoret) (*a, c, g,* from specimen from Tegucigalpa, Honduras; *i, j, s,* from Vera Cruz, Mexico; *r* from Yepocapa, Guatemala; remainder from El Salvador; plate not shown in *c*): *p,* Aedeagus and paraphyses, from lateral view; *q, r,* aedeagus from ventral view; *s,* apex of forewing.

The known distribution of *Chlorogonalia* is southern Mexico, Guatemala, El Salvador, Costa Rica, Venezuela, Colombia, Ecuador, Peru and central and southern Brazil. *Chlorogonalia* is closely related to the genus *Cicadella* Latreille from which it differs only slightly. The first posterior tarsite has two rows of longitudinal, very small setae, none of which are paleate, in *Chlorogonalia*; one row of setae, some of which are paleate, and the setae of the second row longer in *Cicadella*. The rami of the paraphyses of *Chlorogonalia* are narrower than in *Cicadella*. *Chlorogonalia* is also near *Draeculacephala* Ball and *Carneocephala* Ball, from both of which it differs in lacking an anteapical plexus of veins in the forewing.

My interpretation of *Tettigonia coeruleovittata* Signoret is based on an examination of the lectotype in NMV. Fowler's *delineata* has been synonymized as a result of an examination of the lectotype of that nominal species.

SPECIES OF *CHLOROGONALIA*

coeruleovittata (Signoret), 1855d:813, 835 (*Tettigonia*) (new name). S. Mexico, Guatemala, El Salvador, Costa Rica, Venezuela, Colombia, S. Brazil. New combination.
lineata (Signoret), 1854a:21 (*Tettigonia*) (preoccupied).
coeruleovittata var. *delineata* (Fowler), 1900c:277 (*Tettigonia*).
delongi, n. sp. Mexico.
losoplanensis (Schröder), 1959a:67 (*Tettigella*). Mexico, Panama. New combination.
tharma, n. sp., Peru, Ecuador, central Brazil.
ultima, n. sp. Ecuador, Peru, Colombia.

KEY TO SPECIES OF *CHLOROGONALIA*

1. Forewing subhyaline with brown veins ..... *delongi,* n. sp., page 579
   Forewing not so 2

2. Crown with width of median subapical black spot not, or only slightly, greater than distance between adjacent muscle impressions
   losoplanensis (Schröder) (fig. 470)
   Crown with width of median subapical black spot much greater than distance between adjacent muscle impressions 3

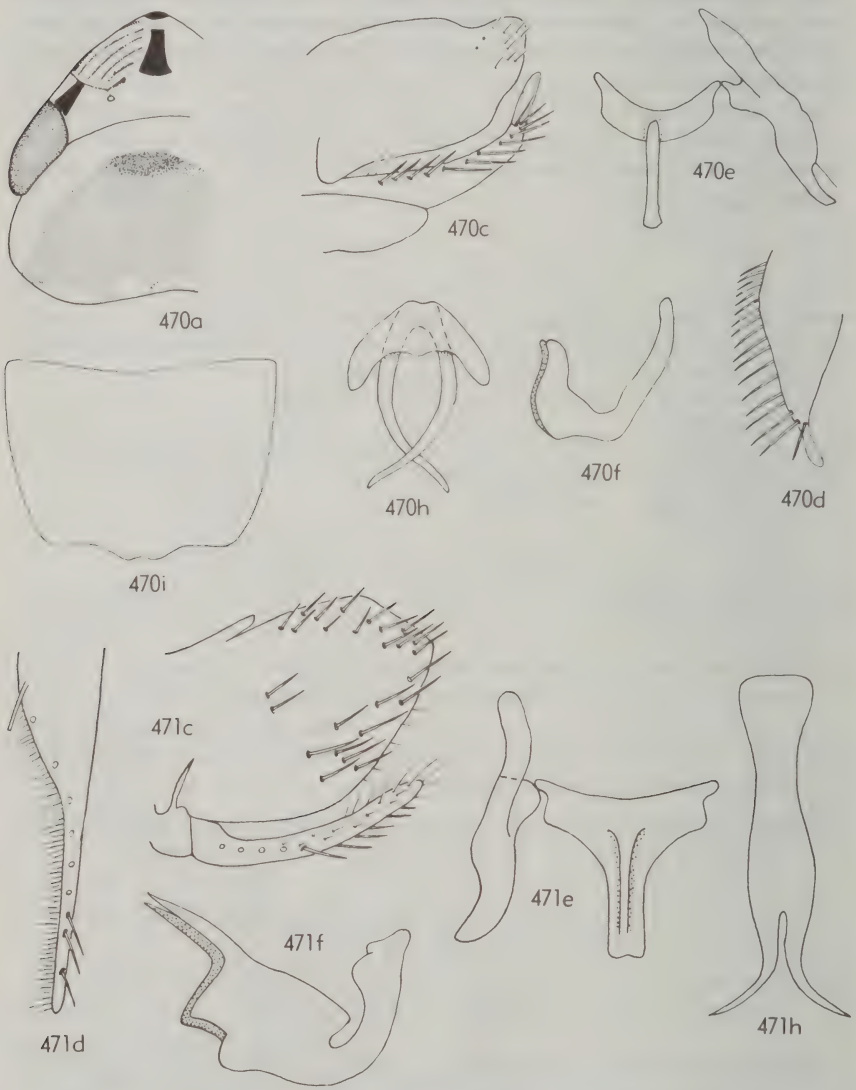
3. Length of male 8.1-9.6 mm; clypeus and clypellus often black (female unknown); aedeagus in lateral view curved sharply dorsally
   tharma, n. sp. page 576
   Length of male 6.5 mm or less; face with clypeus and clypellus not black; aedeagus in lateral view curved gradually dorsally 4

4. Aedeagus in lateral view with a strong convexity on shaft at midlength; shaft broadly convex in caudoventral view (Central America and Venezuela) ..... *coeruleovittata* (Signoret) (fig. 469)
   Aedeagus in lateral view without a convexity on shaft at midlength; shaft not, or only very slightly, convex in caudoventral view (Ecuador)
   ultima, n. sp., page 577

Chlorogonalia tharma, NEW SPECIES

FIGURE 471

Length of male 8.1-9.6 mm. Head with median length of crown varying from slightly less than six-tenths to slightly more than seven-tenths interocular width, and from slightly less than four-tenths to slightly more than



FIGURES 470, 471.—470, *Chlorogonalia losoplanensis* (Schröder) (*i* from specimen from Michoacán, Mexico, remainder from Mexico; *h* from dorsal view). 471, *C. tharma*, n. sp. (from specimen from Itaituba, Brazil; *h* from dorsal view).

four-tenths transocular width; surface concave anteapically and without sculpturing; antennal ledges with anterior margins oblique and convex. Pronotum with dorsopleural carinae complete; forewing with membrane including all of apical cells except a very small inner basal portion of outer apical cell, and rarely with a small basal portion of second and third apical cells also coriaceous; veins not elevated, not very distinct; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer with anteapical macrosetae as in most other species of *Chlorogonalia,* but forming only a part of a group that extends basally and submarginally along dorsal and posteroventral margins, also with a few macrosetae arising near middle of disk; plates with apices not more weakly sclerotized than remainder, extending posteriorly as far as pygofer apex; style without preapical lobe, apex truncate; connective with stem as long as arms; aedeagus broad basally, abruptly narrowed and curved sharply dorsad at midlength, its apical half approximately as broad in caudoventral as in lateral view; paraphyses stalked with rami arising in apical one-half. Female unknown.

Color dark green with yellow areas as in generic description; crown with an angular discal black spot, larger and occurring much more basally than in *C. losoplanensis* (Schröder) its total width considerably greater than distance between dorsal muscle impressions, not connected with a small black spot at apex of head; without a black spot on upper limit of each antennal ledge; clypeus and clypellus partly or entirely black (Peruvian specimens) or yellow with faint black muscle impressions; thoracic pleura and all of venter yellowish-green, legs yellowish-green or dull orange.

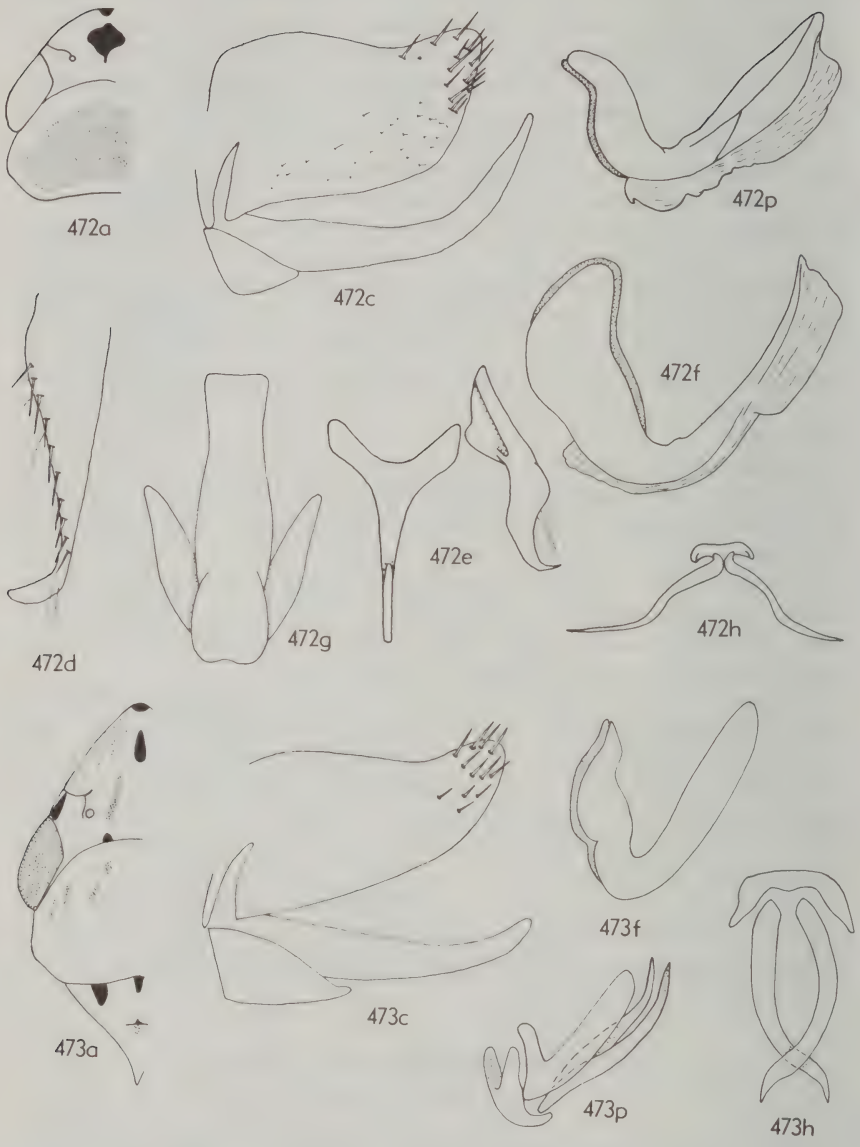
Holotype male, Archidona, Ecuador (R. Haensch), bearing a handwritten label: "*Tettigoniella ventralis - viridis* Sign.", four additional males, same locality; three males, Itaituba, Brazil (USNM). Four males, Itaituba, Brazil; two males, labeled "Peru"; and six males, Rioja Peru (MMB). Nineteen males, Monsón Valley, Tingo María, Peru, December 9, 1954 (E. I. Schlinger and E. S. Ross); three males, same data as preceding except date which is December 10, 1954 (CAS).

C. tharma, n. sp. is more similar to *C. coeruleovittata* (Signoret) than to *C. losoplanensis* (Schröder). It may be readily separated from both of these by its paraphyses which are stalked to a point beyond their midlength and by the more sharply curved aedeagus.

Chlorogonalia ultima, NEW SPECIES

FIGURE 472, PAGE 578

Length of male 4.9-5.9 mm, of female 5.6-6.5 mm. Head with median length of crown from slightly more than one-half to two-thirds interocular width and from one-third to four-tenths transocular width; surface usually slightly concave anteapically and without sculpturing; antennal ledges with anterior margins vertical and rectilinear in lateral view. Pronotum with dorsopleural carina not very distinct, complete or not; forewing with membrane including all of apical cells, veins elevated and distinct; hindleg with length of



FIGURES 472, 473.—472, *Chlorogonalia ultima*, n. sp. (*a*, *f*, *g*, from holotype; remainder from specimen from Ecuador; *h* from dorsal view): *p*, Aedeagus from lateral view. 473, *C. delongi*, n. sp. (*f* from specimen from Michoacán, Mexico; remainder from holotype; *h* from ventral view): *p*, Aedeagus and paraphyses, from lateral view.

first tarsomere greater than combined length of two more distal tarsomeres. Male plates extending posteriorly considerably beyond pygofer apex; style not extending posteriorly as far as apex of connective, lobed near midlength of shank, apex obliquely truncate; aedeagus with dorsal margin not or only weakly convex in lateral view, ventral margin membranous and protruding, shaft with lateral margins not strongly convex in caudoventral view; paraphyses with rami separating at base. Female abdominal sternum VII with posterior margin gradually and regularly produced posteriorly and smoothly rounded.

Color dark to pale green with yellow areas as in generic description; crown with black spots as in *C. tharma,* n. sp.; without a black spot at upper limit of each antennal ledge; clypeus and clypellus yellow with faint black muscle impressions; thoracic pleura and legs yellowish-green to sordid yellow.

Holotype male, Baños, Ecuador, June 25, 1937, 1,900 m. (W. C. Macintyre) (USNM). One male, Playas, Ecuador, April, 1938 (same collector); a long series of specimens of both sexes, Santo Domingo de los Colorados, Ecuador, 510 m. (P. Rivet), 1905, and Loja, Ecuador, 1905 (same collector) (MHNP).

Since the above description was written, I have seen a long series of specimens from Chilicay, Chimborazo, Ecuador, and shorter series from Balzapamba, Ecuador; Los Ríos, Ecuador; and Guayaquil, Ecuador (USNM). I have also identified specimens from Callas, Peru and Sullana, Peru (on grass), and a series from 13 miles W. of Cali, Valle, Colombia.

C. ultima, n. sp., is the smallest species in the genus, being about the same length as the smallest specimens of *C. coeruleovittata* (Signoret), but the latter are more robust. *C. ultima* may be readily separated from other species in the genus by the form of the aedeagus. *C. ultima* is similar in appearance to several small species of *Caldwelliola,* new genus, from Trinidad and Tobago Islands and the neighboring South American mainland, but these species differ markedly in the paraphyses (long-stalked or asymmetrical) and they have relatively strongly developed sternal abdominal apodemes (rudimentary in *ultima*).

Chlorogonalia delongi, NEW SPECIES

FIGURE 473, PAGE 578

Length of male 6.3-8.4 mm; of female 8.4-8.5 mm. Head well produced, median length of crown varying from eight-tenths to almost nine-tenths interocular width, and slightly more than one-half transocular width; ocelli located before a line between anterior eye angles, crown convex and weakly punctate; antennal ledges with anterior margins vertical and rectilinear; other head characters as in generic description. Thorax with pronotal dorsopleural carina absent or very weak; disk transversely rugose; scutellum weakly transversely striate behind transverse sulcus. Forewing without a membrane, veins elevated and distinct, texture membranous with veins pale brown; other wing characters as in generic description. Male plates extending posteriorly as far as

pygofer apex; style not extending posteriorly quite as far as apex of connective, with preapical lobe; paraphyses not stalked basally. Female as in generic description.

Color of crown, pronotum, and scutellum dull tan, crown with a small round spot at apex, a median spot behind apex, a marginal marking on each antennal ledge, a pair of longitudinal stripes between the ocelli, and a spot on posterior margin on each side of middle, black; pronotum with a few vermiculate markings on anterior half; scutellum with a pair of anterior spots and a median anterior marginal spot (absent in some specimens) black, and with a longitudinal weaker dark median stripe bisecting the transverse sulcus; forewings pale gray with brownish veins; face tan with muscle impressions of clypeus, lower margin of each antennal ledge, and a few markings on genae black, median line of clypellus brown in its apical portion, and median line of clypeus similarly marked in some specimens; thoracic pleura, venter, and legs dull yellow to tan.

Holotype and one additional male and four females, Río Frio, D. F., Mexico, November 22, 1941 (DeLong, Caldwell, and Plummer); one male, Acapulco Road, Mexico, November 22, 1938 (J.S. Caldwell); one male and one specimen without abdomen, Carapán, Michoacán, Mexico, October 2, 1941, Km. 432 (DeLong, Caldwell, and Plummer); and one male Puebla, Puebla, Mexico, October 18, 1941, K78 (same collectors as preceding) (DeLong collection, OSU).

The nearly translucent forewings will separate *Chlorogonalia delongi,* n. sp., from the other species in the genus.

I take pleasure in naming this species in honor of Dr. D. M. DeLong whose collections from Mexico have been most helpful during the present study.

76. Genus DRAECULACEPHALA Ball

Draeculacephala Ball, 1901b:66. Type-species: *Tettigonia mollipes* Say, by original designation.

Length 4.8-11.4 mm.

Head well produced with length of crown quite variable interspecifically, anterior margin varying from broadly rounded to acutely angular in dorsal view, apex angular at transition from crown to face, ocelli in line with anterior eye angles and each approximately equidistant from adjacent anterior eye angle and median line of crown in male, slightly nearer eye in female, surface of crown concave anteapically, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli, antennal ledges not protuberant, carinate dorsally, their anterior margins slightly concave in lateral view; face with clypeus usually slightly convex or flattened, clypellus as in *Cicadella* Latreille but without pubescence; transclypeal suture nearly or quite complete.

Thorax with pronotal width less than transocular width of head, lateral margins subparallel, dorsopleural carinae absent, other pronotal characters and scutellum as in *Cicadella.* Forewing with membrane narrow, extending

completely around apex and proximally as in *Cicadella,* veins distinct, not elevated, with four apical cells, the base of the fourth located more proximally than base of third, with an anteapical plexus of veins, texture coriaceous, without sculpturing; wings of female at rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length approximately equal to combined length of second and third tarsomeres, usually with two parallel rows of setae on plantar surface, at least the more proximal of one row of these paleate in some species.

Male genitalia: Pygofer moderately produced posteriorly and narrowly convex apically, with a few short macrosetae near posterodorsal margin, without processes. Plates separate throughout their length, their apices weakly sclerotized, extending posteriorly about as far as pygofer apex, each triangular and with a row of fairly stout macrosetae along lateral margin. Style not extending as far posteriorly as apex of connective, with preapical lobe, apex obliquely truncate. Connective Y-shaped with stem much longer than arms. Aedeagus short, symmetricial, articulated with connective, with or without processes. Paraphyses present, paired, symmetrical, not stalked basally, rami narrow.

Female abdominal sternum VII with posterior margin slightly produced medially and rounded or truncate. Other characters as in *Cicadella,* the dorsal margin of the second valvula of the ovipositor occasionally flat or slightly concave near its midlength, and female pygofer with setae less numerous than in *Cicadella.*

The known distribution of *Draeculacephala* Ball is from Alaska and Newfoundland to the Guianas and Argentina. *Draeculacephala* belongs to a complex of genera discussed briefly in the treatment of *Cicadella* Latreille. In this group it is closest to *Carneocephala* Ball from which it is most readily distinguished by the hind femoral setal formula which is 2:1:0 in *Carneocephala. Draeculacephala* is also near *Helochara* Fitch in structure, but it lacks the pits characteristic of *Helochara* and has a plexus of veins on the forewing that is lacking in *Helochara.* Only *Draeculacephala* and *Carneocephala* of the *Cicadella* generic group have this plexus.

Norment, Haskins, and Hepner (1972a) reported generic differences in protein bands in electrophoretic studies of two species of *Draeculacephala* and one species of *Carneocephala.*

A revision of *Draeculacephala* by Young and Davidson (1959a) should be consulted for the key to species, and for descriptions, illustrations of the species, and biological information. Since that paper was published, Hamilton (1967a) has described *D. robinsoni* in the difficult *D. portola* complex. Although it may be biologically distinct, the characters do not warrant retaining it, and I have placed it as a synonym of *portola* Ball in the list that follows. As in other components of the *portola* complex, biological studies may eventually establish valid species, but assuming that groups that appear somewhat distinct are actually species, without good diagnostic characters, is likely to result only in confusion.

Mason and Yonke (1971a) published a study of the life histories of four species of *Draeculacephala* in Missouri in which they reported that they were

unable to obtain viable eggs of *D. delongi* Young and Davidson, although their rearing efforts were successful with the other three species. Additional study is needed to discover whether *delongi* should also be placed in synonymy under one of the other species. The paper lists a number of food plants of the species studied.

SPECIES OF *DRAECULACEPHALA*

angulifera (Walker), 1851b:771 (*Tettigonia*). Newfoundland to Pennsylvania and west to Colorado; B. Colombia; Yukon Territory, Alaska.

manitobiana Ball, 1901b:70.

antica (Walker), 1851b:771 (*Tettigonia*). Quebec to Virginia and west to Colorado; Texas; Arizona.

balli Van Duzee, 1915b:179. Virginia to Florida, Alabama, Mississippi, Louisiana, Texas, and Tennessee to Missouri.

bradleyi Van Duzee, 1915b:180. North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida, Cuba, Isle of Pines.

clypeata Osborn, 1926b:236. Mexico to Colombia, B. Guiana, Peru, Argentina.

lenticula Ball, 1927c:38.

crassicornis Van Duzee, 1915b:181. Alaska, B. Colombia, Alberta, Manitoba, Washington, Oregon, California, Idaho, Wyoming, Utah, Colorado, Nebraska.

delongi Young and Davidson, 1959a:18. Ontario and Maine to Florida and west to Minnesota and Missouri.

inscripta Van Duzee, 1915b:180. Maryland, Virginia, Georgia, Florida, Ohio, Illinois, Tennessee, Mississippi, Arkansas, Louisiana.

minerva Ball, 1927c:36. N. California, S. Nevada, Brownsville, Texas south to Panama.

mollipes (Say), 1840b:312 (*Tettigonia*). Quebec to North Carolina, west to Kansas and Texas.

constricta Davidson and DeLong, 1943b:193.

noveboracensis (Fitch), 1851a:56 (*Aulacizes*). Maine to Pennsylvania; Ontario, Wisconsin, Illinois west to Washington and Oregon; California, B. Colombia.

prasina (Walker), 1851b:768 (*Tettigonia*).

pagoda Ball, 1927c:37. Florida.

portola Ball, *sens. st.*, 1927c:35. Ontario to S. Florida and west to Texas; California, Mexico, Honduras, Cuba, Hawaii.

cubana Metcalf and Bruner, 1936a:936.

californica Davidson and Frazier, 1949a:127.

robinsoni Hamilton, 1967a:767. New synonymy.

portola ssp. *paludosa* Ball and China, 1933a:3. Iowa, Minnesota, Illinois.

producta (Walker), 1851b:772 (*Tettigonia*). North to south Florida.

minor (Walker), 1851b:772 (*Tettigonia*).

acuta (Walker), 1851b:773 (*Tettigonia*).

septemguttata (Walker), 1851b:773 (*Tettigonia*). North Carolina to Florida, Louisiana, Mississippi.

soluta Gibson, 1919b:25. S. Mexico, Guatemala, Honduras, El Salvador, Panama, Colombia

77. Genus CARNEOCEPHALA Ball

Figures 474-477

Carneocephala Ball, 1927c:39. Type-species: *Draeculacephala floridana* Ball, by original designation.

Length of male 3.4-6.5 mm, of female 4.2-8.7 mm.

Head variable interspecifically, from slightly to very strongly produced, anterior margin varying from narrowly rounded to acutangular in dorsal view, apical margin not angulate at transition from crown to face (exception: *C. floridana* (Ball) in which extreme apex is angular), ocelli located on or before a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, surface of crown convex anteapically or shallowly concave (exception: *floridana* in some specimens of which there is a median longitudinal fossa), surface granular; antennal ledges not carinate; face with clypeus convex, muscle impressions not distinct, clypellus with its lower portion more nearly horizontal than profile of clypeus, without pubescence, transclypeal suture obsolete medially.

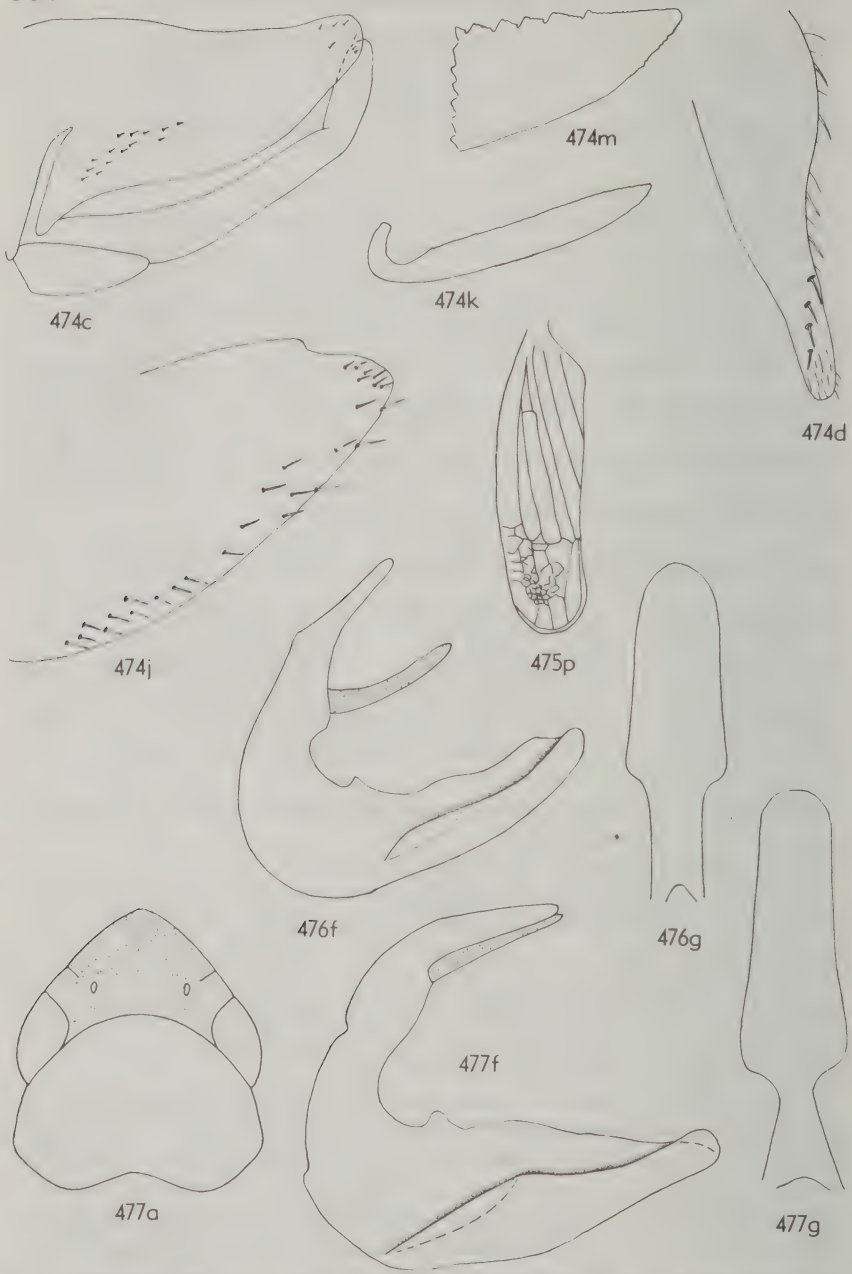
Thorax with pronotal width equal to, or (usually) less than transocular width of head, lateral margins varying from parallel to slightly convergent anteriorly, dorsopleural carinae absent, posterior margin concave, disk punctate to weakly striate, scutellum not transversely striate behind transverse depression. Forewing with membrane usually not extending as far proximad along costal margin as in *Cicadella* Latreille, veins elevated and distinct, cells weakly transversely rugulose, other forewing characters as in *Draeculacephala* Ball. Hindleg with femoral setal formula 2:1:0; other leg characters as in *Draeculacephala*.

Male pygofer with few small setae on disk near base, other male genital characters as in *Draeculacephala*.

Female genital characters as in *Draeculacephala*.

Specimens of *Carneocephala* Ball have been studied from Delaware, Ohio, and Nebraska to Florida, Louisiana, Arizona, and California, from the Bahamas, from the West Indies and the Virgin Islands, from numerous localities in Mexico and Central America, and from Colombia. Dr. R. Linnavuori has collected specimens from the Ivory Coast, apparently recently introduced. *Carneocephala* Ball is closely related to *Draeculacephala* Ball in the treatment of which distinguishing characters are discussed.

I have studied a number of dissections of males and am uncertain about species limits and characteristics. I have not, therefore, tried to write a key. Dr. M. W. Nielson and at least one of his colleagues have been doing biological studies on some species of *Carneocephala* in Arizona, recently. Perhaps their results will help in resolving some of the difficulties. In the one report of their results available as this is written (Nielson and Toles, 1970a), they found that the forms *Carneocephala triguttata* Nottingham and *C. nuda* Nottingham were not completely reproductively isolated under laboratory conditions. Hopefully, their work will produce additional important data as to the validity of the "species" in this genus.



FIGURES 474-477.—474, *Carneocephala floridana* (Ball) (*j*, *k*, *m*, from specimens from Brownsville, Texas; remainder from Florida). 475, *C. flaviceps* (Riley): *p*, Forewing. 476, *C. sagittifera* (Uhler), "type" (from St. Vincent, B. W. I.). 477, *C. dyeri* (Gibson) (*a* from specimen from León, Mexico; *f*, *g*, from topotypic paratype).

A number of accounts have been published indicating that several species of *Carneocephala* are common on Bermuda grass. Others have been reported on other grasses and on sugar cane. *Carneocephala flaviceps* (Riley) is one of the commonest leafhopper species occurring at light in the Coastal Plain of North Carolina, and probably is of economic importance in this area, as it has been reported to be in the West Indies. Mason and Yonke (1971b:113) listed the plants from which *flaviceps* has been collected. Three species have been found to transmit the pathogen of Pierce's disease which affects grapes and alfalfa (Nielson, 1968c:108-116). *C. floridana* (Ball) was collected by Ball on chenopodiaceous plants in southeastern Florida.

SPECIES OF *CARNEOCEPHALA*

(Nominal species, and type-localities only)

balli Knull, 1940b:240. Arizona
diducta (Fowler), 1900c:274 (*Tettigonia*). Mexico.
dyeri (Gibson), 1919b:25 (*Tettigonia*). Honduras.
flaviceps (Riley), 1880a:78 (*Diedrocephala*). Texas.
floridana (Ball), 1901b:72 (*Draeculacephala*). Florida.
fulgida Nottingham, 1932a:101. California.
gillettei (Ball), 1901b:72 (*Draeculacephala*). Colorado.
nuda Nottingham, 1932a:107. Arizona.
reticulata (Signoret), 1854a:22 (*Tettigonia*). Cuba.
sagittifera (Uhler), 1895a:76 (*Tettigonia*). St. Vincent, B.W.I.
triguttata Nottingham, 1932a:108. California.

78. Genus TYLOZYGUS Fieber

Figures 478-480

Tylozygus Fieber, 1866a:501. Type-species: *Tettigonia nigrolineata* Herrich-Schäffer, which is a synonym of *Tettigonia bifida* Say, by monotypy.

Length of male 4.0-5.2 mm, of female 4.8-6.0 mm.

Head slightly to moderately produced, median length varying from three-tenths to two-thirds interocular width and from one-fourth to one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or before a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle or slightly closer to latter, crown convex without a concavity across ocelli, surface irregularly punctate; antennal ledges not protuberant in dorsal view, not carinate, in lateral view with anterior margins rectilinear, or concave and vertical or slightly oblique, clypeus convex, granulate medially, not or scarcely flattened medially, muscle impressions not very distinct, transclypeal suture entire or obsolete medially, other head characters as in *Ciminius* Metcalf and Bruner.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae not complete; posterior margin slightly convex or slightly concave, disk not sculptured, without pubescence; scutellum not transversely rugulose behind transverse sulcus.

Forewing with membrane clearly delimited, including all of apical cells, veins distinct, with three anteapical cells of which the inner two are open basally, with four apical cells and base of fourth located more proximally than base of third, texture coriaceous or translucent except membrane, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:0, first tarsomere with length equal to or slightly greater than combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface, the rows dissimilar in size of their included setae, but without paleate setae.

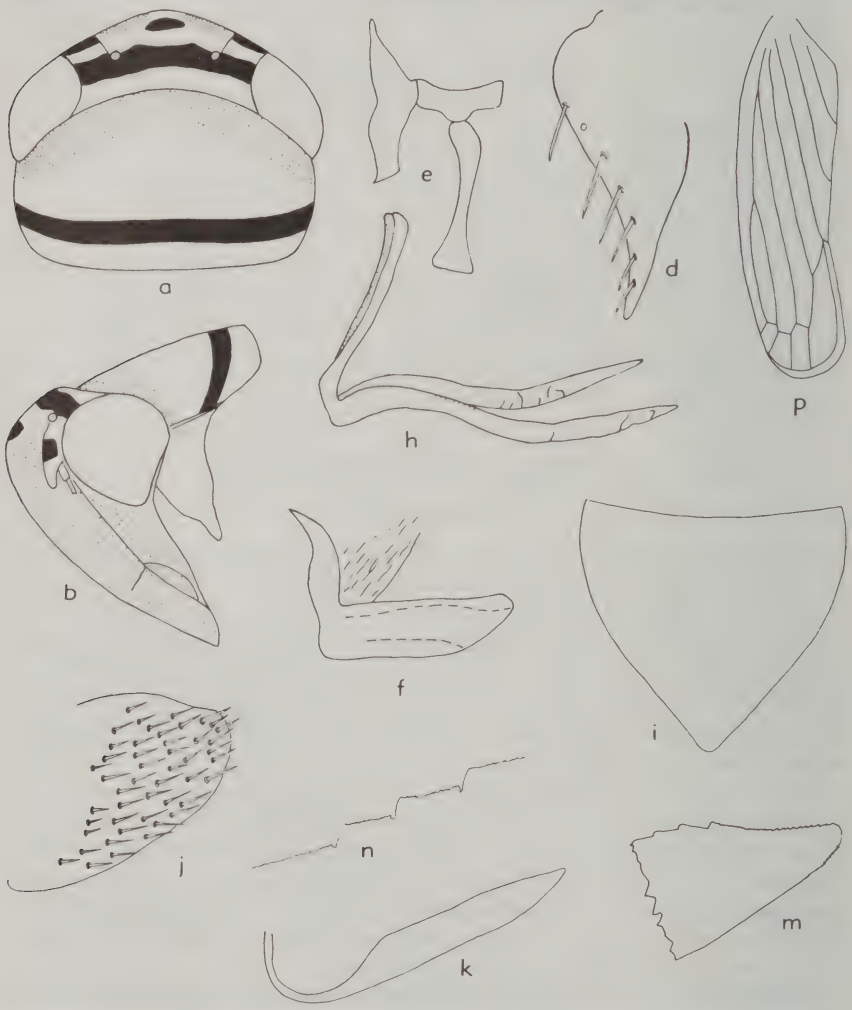


FIGURE 478.—*Tylozygus fasciatus* (Walker) (*a, b, d-f, h,* from specimen from El Salvador; *p* from Acapulco, Mexico; remainder from Trinidad, B. W. I.; *h* from lateral view; portion of anal tube shown in *f*): *p,* Forewing.

Male genitalia: Pygofer not strongly produced, posterior margin slightly and broadly convex, with numerous macrosetae of uniform size occurring on most of surface except a narrow anterior region, pygofer without processes. Plates triangular, short, not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae. Style not extending posteriorly nearly as far as connective, preapical lobe distinct, apex truncate. Connective T-shaped with stem occurring as separate sclerite and articulating with transverse portion, extending posterodorsally, not strongly keeled. Aedeagus short, without lobate processes on shaft. Paraphyses paired, symmetrical, but not lying in symmetrical planes.

Female abdominal sternum VII with posterior margin produced to subangulate apex. Genital chamber without sclerites. Ovipositor with second valvula as in *Ciminius,* (below) except that anteapical dorsal and ventral denticles are present, its ventral margin convex in the expanded portion. Pygofer with numerous macrosetae arranged fairly uniformly over posterior two-thirds of surface.

Specimens belonging to *Tylozygus* Fieber have been studied from Vermont, Quebec and Ontario to Texas and Florida in North America, also in Central America, the West Indies, Colombia, Venezuela, Ecuador, Peru, and southern Brazil. *Tylozygus* appears closely related to *Ciminius* Metcalf and Bruner from which it may be separated readily by the venation of the forewings, and by the paired paraphyses in *Tylozygus*.

The type specimen(s) of *T. bifidus* (Say) was/were presumably destroyed, but the species, as interpreted here, is the only one that occurs in Indiana, which is the type-locality. The original illustration (1838c: pl. 17) of *Tettigonia nigrolineata* Herrich-Schaeffer appears to be a *Tylozygus,* but I cannot place it specifically from the illustration, which doesn't agree with the description. Almost surely the European locality records for this species are in error. The original description merely states that the specimen(s) was sent from Prague. I follow Oman (1949a:66) and Metcalf (1965a:448) in placing it as a synonym of *bifidus* (Say). I have not seen a specimen which might have been the type of *nigrolineata*. *Tettigonia tenella* Walker and *Iassus leucomelas* Walker are listed in synonymy under *Tylozygus bifidus* (Say) as a result of my examination of the holotypes of the two Walker nominal species.

I have not seen a specimen eligible to be a lectotype of *Tettigonia fasciata* Walker. I follow Metcalf and Bruner (1936a) in their interpretation of this species. The species was described from "United States" which may have been in error, or it may have referred to Brazil. The key, below, will serve to distinguish *fasciata* from other species. I list *Tettigonia fuscolineella* Fowler in synonymy as a result of an examination of the lectotype of the latter. I have not studied a specimen of *Tettigonia fuscolineella* var. *fronterae* Fowler.

My identification of *Tettigonia geometrica* Signoret rests on a study of the lectotype. I have also studied the lectotype of *Tettigonia psitacella* Fowler and the holotype of *Kolla carabela* Metcalf and Bruner. I have not seen type material of *Tettigonia atrovirens* (Lethierry). The synonymy in the list of species (below) is based on the original description.

Specimens of *Tylozygus* are probably grass-feeders. *T. bifidus* (Say) is commonly found on grasses in the U.S.A. *T. fasciatus* (Walker) is reported by Martorell (*in* Caldwell and Martorell 1952a:14) in grassy meadows in Puerto Rico. Specimens of *fasciatus* from Colombia were collected on "legumes" and beans, in addition to grasses, and some specimens from Ecuador were collected on sweet potatoes.

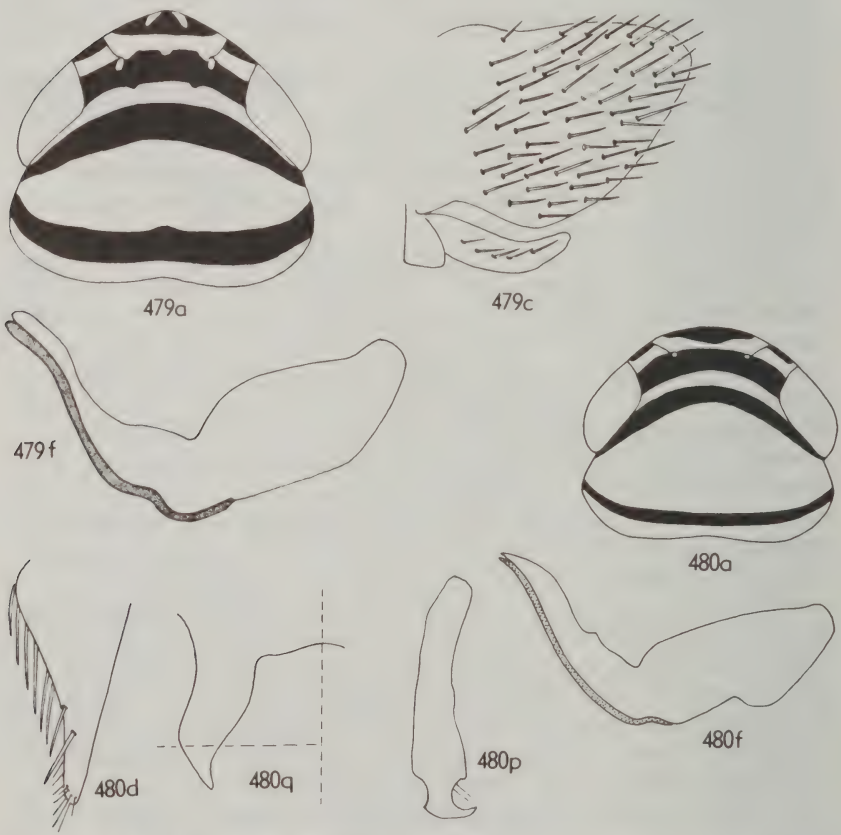
SPECIES OF *TYLOZYGUS*

bifidus (Say), 1830b:313 (*Tettigonia*). North America: Vermont to Florida and west to Kansas and Texas.

nigrolineata (Herrich-Schaeffer), 1838c:17 (*Tettigonia*).

tenella (Walker), 1851b:770 (*Tettigonia*).

leucomelas (Walker), 1851b:272 (*Iassus*). New synonymy.



FIGURES 479, 480.—479, *Tylozygus bifidus* (Say) (from specimen from Balsam, North Carolina). 480, *T. geometricus* (Signoret) (*p* from specimen from Raleigh, N. C.; remainder from Trinidad): *p*, Style from lateral view; *q*, ventral abdominal apodeme of sternum II (horizontal broken line represents conjunctiva).

fasciatus (Walker), 1851b:780 (*Tettigonia*). "United States", S. Mexico, Guatemala, Br. Honduras, El Salvador, Costa Rica, Panama, Haiti, Is. Dominica, Grenada, Trinidad Is., Jamaica, Venezuela, Colombia, Ecuador, Peru, S. Brazil.

fuscolineella (Fowler), 1900d:290 (*Tettigonia*).

fronterae (Fowler), 1900d:290 (*Tettigonia fuscolineella* var.).

geometricus (Signoret), 1854a:12 (*Tettigonia*). Southern U. S. A., Mexico, Honduras, Guatemala, El Salvador, Costa Rica, Panama, Cuba, Sta. Lucía Is., Is. Dominica, Trinidad Is., Colombia, Venezuela, Peru, S. Brazil.

atrovirens (Lethierry), 1890a:157 (*Tettigonia*). New synonymy.

psitacella (Fowler), 1900d:290 (*Tettigonia*).

plutoniella (Ball), 1936a:22 (*Kolla*). New synonymy.

carabela (Metcalf and Bruner), 1936a:943 (*Kolla*). New synonymy.

KEY TO SPECIES OF *TYLOZYGUS*

1. Pronotum with anterior margin broadly brown ..... *fasciatus* (Walker) (fig. 478)

   Pronotum with anterior margin usually black, never brown 2

2. Larger specimens, length 4.5-5.9 mm; claval commissural margin narrowly fuscous; forewings usually with veins broadly black ..... *bifidus* (Say) (fig. 479)

   Smaller specimens, length 4.0-5.3 mm; claval commissure yellow or green or if fuscous then entire forewing is dark; forewing usually green with veins narrowly black ..... *geometricus* (Signoret) (fig. 480)

79. Genus CIMINIUS Metcalf and Bruner

Figures 481-486

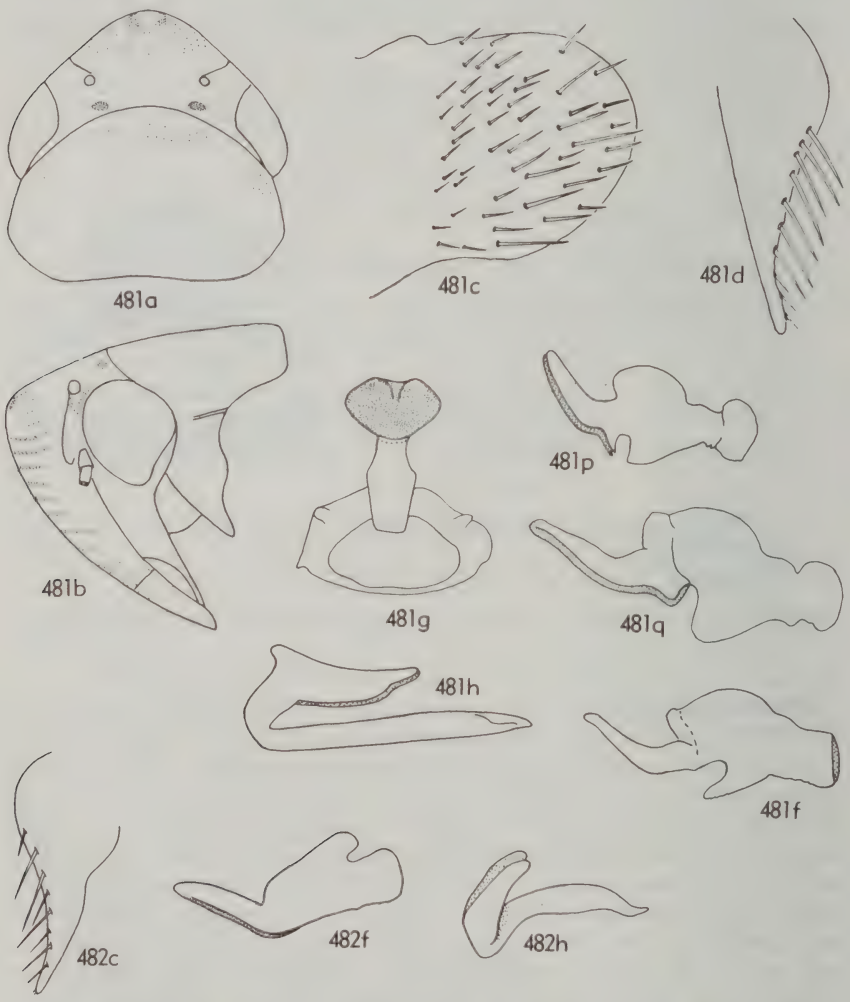
Ciminius Metcalf and Bruner, 1936a:944. Type-species: *Tettigonia harti* Ball, by original designation.

Length of male 3.6-4.7 mm, of female 4.2-5.6 mm.

Head only slightly produced, median length of crown from four-tenths to six-tenths (usually to only slightly more than one-half) interocular width and from one-fourth to slightly more than one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli in line with anterior eye angles, each closer to adjacent anterior eye angle than to median line, crown convex without a concavity across ocelli, surface punctate, or occasionally rugulose, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, not carinate, in lateral view with the anterior margins rectilinear or concave, and vertical or slightly oblique; clypeus convex, granulate or punctate medially, not flattened, muscle impressions distinct, transclypeal suture usually entire; clypellus in profile continuing contour of clypeus, without pubescence.

Thorax with pronotal width varying intraspecifically compared with transocular width of head, from less than to greater than latter, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete or

not, posterior margin concave, disk usually transversely rugose (variable intraspecifically), without pubescence; scutellum usually transversely rugulose behind transverse sulcus. Forewing without a clearly delimited membrane, veins distinct, with only two anteapical cells of which the outer is open basally, with four apical cells and base of fourth located much more proximally than base of third, occurring almost as far, or quite as far basally as



FIGURES 481, 482.—481, *Ciminius harti* (Ball) (*g*, *q*, from specimen from Guthrie, Oklahoma; *h* from Lake Charles, Louisiana; *p* from Flat Shoals, Georgia; remainder from Brownsville, Texas; plate not shown in *c*; *h* from lateral view): *p*, *q*, Aedeagus from lateral view. 482, *C. yana*, n. sp., holotype (*h* from lateral view).

base of inner apical cell, texture coriaceous basally, becoming gradually translucent apically, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:0; first tarsomere shorter than combined length of two more distal tarsomeres and with two parallel longitudinal rows of small setae on plantar surface, some of the setae paleate in both rows in some specimens.

Male genitalia: Pygofer not strongly produced, posterodorsal margin convex, posteroventral margin usually concave, with numerous macrosetae of varying sizes on posterior two-thirds of disk, pygofer processes absent. Plates triangular, not extending posteriorly as far as pygofer apex, mesal margins curved slightly laterad at base, with uniseriate macrosetae. Style not extending nearly as far posteriorly as apex of connective, preapical lobe distinct or not, apex truncate. Connective Y-shaped with arms widely divergent, the stem occurring as a separate sclerite, articulating with arms, extending dorsally and keeeled medially. Aedeagus short, with or without a lobate process on shaft. Paraphyses unpaired except at base, slender and acute apically, unpaired portion lying in median sagittal plane.

Female abdominal sternum VII with posterior margin usually transverse, slightly produced and subangulate medially (exception: *C. albolineatus* (Taschenberg), in which it is regularly convex). Genital chamber without sclerites. Ovipositor with second valvula broadened beyond basal curvature, its ventral margin convex or concave in the expanded portion, dorsal margin with large primary teeth extending almost to acute apex, with secondary denticles on the primaries, without anteapical dorsal denticles or anteapical posteroventral denticles. Pygofer with small macrosetae near middle of disk and many large macrosetae before apical margin and a few near posteroventral margin.

Specimens belonging to *Ciminius* have been studied from north central, eastern, southern, and southwestern United States, from southern Mexico, Panama, Venezuela, French Guiana, northeastern and southern Brazil, Peru, Bolivia, and Argentina. *Ciminius* is related to *Tylozygus* Fieber, in the discussion of which distinguishing characters are treated.

Cicadella callosa Osborn is known to me only from the female type of which abdominal sternum VII is much like the present illustration of *C. platensis* (Berg).

I have interpreted the commonest species of *Ciminius* in Argentina, judging from collections at hand, as *Ciminius platensis* (Berg), but I have seen no specimen eligible to be type of this species.

The present interpretation of *Ciminius sidanus* (Ball) is based on specimens from Arizona, compared with the type in the USNM by Dr. J. P. Kramer.

In *Ciminius taosus* (Ball), the aedeagus of the male (fig. 485*f*) differs from that of *harti* (Ball) in that the ventral lobe is not as strongly developed in *taosus*. The original description of this species states in one place that the veins are dark, but the statement is contradicted a bit later. The veins of the female specimens at hand are white, the males dark. In genital characters other than the aedeagus, *taosus* is like *harti*.

C. platensis (Berg) has been collected on "grasses" from Campinas, Brazil. *C. albolineatus* (Taschenberg) has been collected on wheat from Cochabamba, Bolivia, by Dr. B. A. Hawes. Ball (1936a) reported *C. harti* (Ball) from *Crotonopsis linearis* Michaux, and *C. sidanus* (Ball) from *Sida "diffisa"* [*diffusa* (?) HBK].

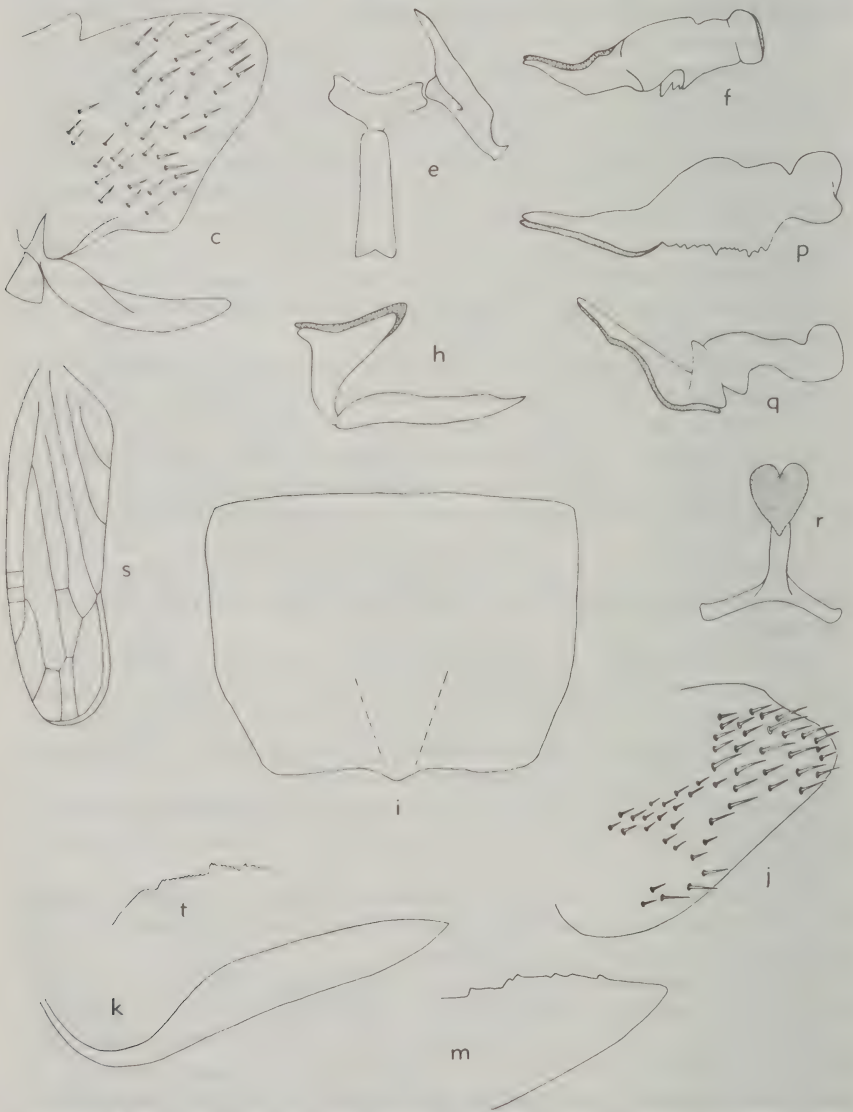


FIGURE 483.—*Ciminius platensis* (Berg) (*i-k*, *m*, *t*, from Tucumán, Argentina; remainder from Misiones, Argentina; *h* from lateral view): *p*, *q*, Aedeagus from lateral view; *r*, aedeagus (same specimen as *q*) from ventral view; *s*, forewing; *t*, base of toothed portion of second valvula.

SPECIES OF *CIMINIUS*

(*Known only from female)

albolineatus (Taschenberg), 1884a:446 *(Tettigonia)*. Cuba, Isle of Pines, El Salvador, Panama, Fr. Guiana, Venezuela, N. and S. Brazil, Bolivia, Argentina. New combination.

**callosa* (Osborn), 1926b:179 *(Cicadella)*. Bolivia. New combination.

harti (Ball), 1901b:61 *(Tettigonia)*. E. United States to Kansas, Oklahoma, and Texas; S. Mexico.

platensis (Berg), 1879d:259 *(Acocephalus)*. Venezuela, Peru, S. Brazil, Paraguay, Argentina. New combination.

sidanus (Ball), 1936a:21 *(Cicadella)*. Arizona, Texas, New Mexico, NW. Mexico.

taosus (Ball), 1936a:20 *(Cicadella)*. New Mexico.

yana, n. sp. W. Brazil, Argentina.

KEY TO MALES OF *CIMINIUS*

(Not included: *callosa* (Osborn))

1. Aedeagus in lateral view with a partly separated dorsal lobe (fig. 482*f*) *yana*, n. sp.
   Aedeagus in lateral view without such a lobe 2
2. Aedeagus in lateral view with shaft very broad throughout length (figs. 484*f, r*) ..... *albolineatus* (Taschenberg) (fig. 484)
   Aedeagus in lateral view with shaft narrowed apically or anteapically 3
3. Crown dull yellow, with two or four very small strongly contrasting black spots (Arizona, Texas, New Mexico, and Mexico) ..... *sidanus* (Ball)
   Crown black, or duller yellow with spots not strongly contrasting and with additional dull brown markings (N. America excluding Arizona; Mexico, S. America) 4
4. Aedeagus with shaft strongly convex dorsally near base, its ventral margin not dentate (Northern Hemisphere) 5
   Aedeagus with shaft only slightly convex dorsally near base, its ventral margin usually dentate (South America) ..... *platensis* (Berg) (fig. 483)
5. Aedeagus with ventral margin of shaft strongly lobed, the lobe occasionally angulate ..... *harti* (Ball) (fig. 481)
   Aedeagus with ventral margin of shaft weakly lobed, and not angulate *taosus* (Ball) (fig. 485)

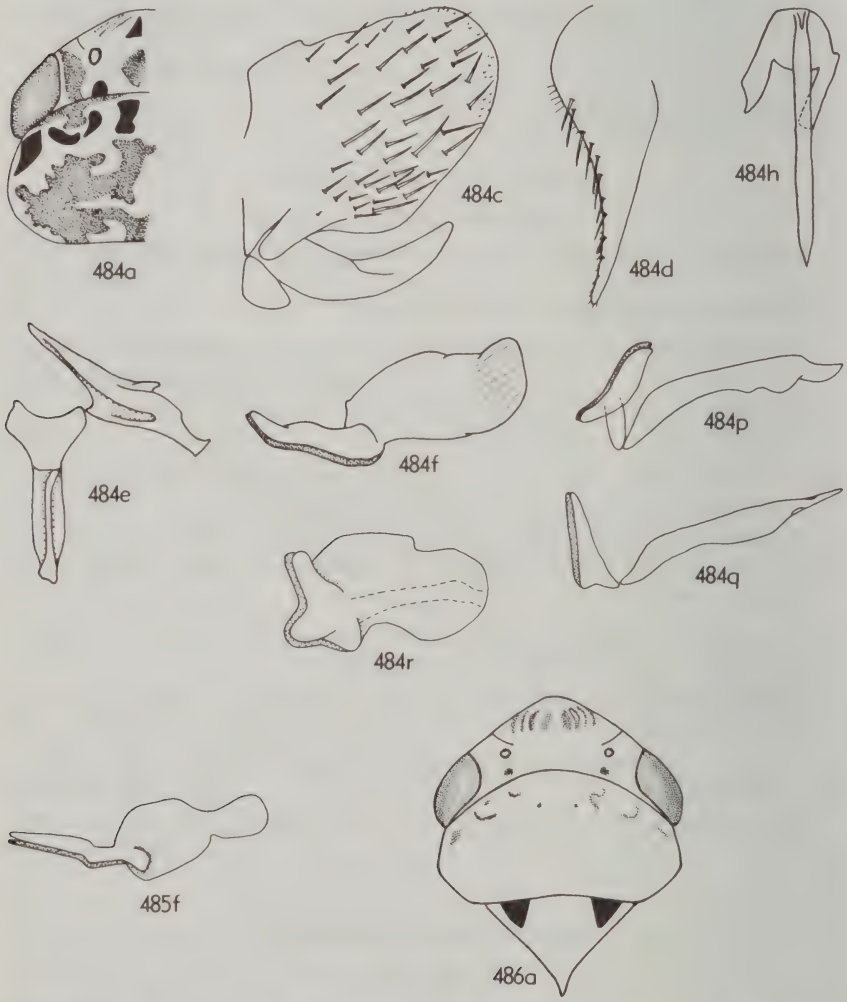
Ciminius yana, NEW SPECIES

FIGURE 482, PAGE 590

Length of male 3.6 mm, of female 4.3 mm. Head with median length of crown from slightly less (male) to slightly more (female) than one-half interocular width, and from one-fourth or slightly more (male) to almost one-third (female) transocular width. Male with aedeagus bearing a distinct posterodorsal lobate protuberance on dorsal margin of shaft in lateral view, ventral

margin of shaft not convex. Paraphyses ramus curved posteroventrally in lateral aspect, subacute at apex. Female abdominal sternum VII as in illustration of *C. platensis* (Berg) (fig. 483*i*).

Color of male shining black dorsally with a spot at apex of head, margin of coronal portion of lateral clypeal sutures, a narrow area bordering mesal margin of each ocellus, a few arcs near anterolateral margin of head, lateral pronotal margins very narrowly, an apical scutellar spot, a linear spot along



FIGURES 484-486.—484, *Ciminius albolineatus* (Taschenberg) (*q*, *r*, from specimen from El Valle, Venezuela; remainder from Brazil; *h* from ventral view): *p*, *q*, Paraphyses from lateral view; *r*, aedeagus (same specimen as *q*) from lateral view. 485, *C. taosus* (Ball) (allotype from Albuquerque, New Mexico). 486, *C. callosa* (Osborn), holotype.

claval suture near base, base of vein R to fork, and middle one-third of costal area, yellow (lateral pronotal margins and base of vein R black in some specimens, yellow in type), face and thoracic pleura black, with yellow arcs on each side of face, with other yellow markings on face and propluera less conspicuous and inconstant, legs brownish yellow. Color of female dull brown dorsally, with slightly paler areas inconstant but with following areas constant and more contrasting: a few spots near anterior margin of pronotum, posterior portion of scutellum, and in the forewing the basal portion of vein R as far as fork; yellow areas near anterior pronotal margin interspersed with black markings; face with clypeus yellow with brown arcs on each side, remainder of venter, thoracic pleura, and the legs, dull yellow, with darker markings not constant.

Holotype and one additional male, "Rio Caraguata", Mato Grosso, Brazil, March, 1953 (F. Plaumann) (NCS). A long series of specimens of both sexes, "Guajara" Mirim, Brazil [labeled Bolivia], February 13, 1943, in DeLong collection (OSU). Holotype on indefinite loan to USNM.

C. yana, n. sp., can be separated from other species in the genus most readily by the distinctive lobe of the aedeagus on the dorsal margin in lateral view.

80. Genus PLESIOMMATA Provancher

Figures 487-492

Plesiommata Provancher, 1889a:263. Type-species: *Plesiommata biundulata* Provancher, which is a junior synonym of *Tettigonia tripunctata* Fitch, by monotypy.

Provancherana Hamilton, 1976a:36. Type-species: *Tettigonia tripunctata* Fitch, by original designation.

Length of male 3.6-5.0 mm, of female 4.0-5.6 mm.

Head moderately to well produced, median length of crown from one-half to almost eight-tenths interocular width and from slightly less than three-tenths to slightly less than one-half transocular width, anterior margin varying interspecifically from broadly to acutely rounded in dorsal view, ocelli on or before a line between anterior eye angles (specifically variable), each closer to adjacent anterior eye angle than to median line of crown, crown without sculpturing or setae; antennal ledges in lateral view with anterior margins rectilinear or nearly so and from vertical to very slightly oblique; clypeus usually convex (slightly flattened medially in *Plesiommata tripunctata* (Fitch)), finely granulate medially, muscle impressions usually distinct (exception: *P. alcorni* Beamer), transclypeal suture entire or narrowly interrupted medially, clypellus extending beyond apices of genae. Other head characters as in *Ciminius* Metcalf and Bruner.

Thorax with pronotal width less than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae incomplete, posterior margin concave, disk with or without transverse striae (variable intraspecifically), not pubescent; scutellum not striate behind transverse sulcus. Forewing hyaline to pale translucent, with at least the longitudinal veins dark, with inner two of three anteapical cells open basally, with four

apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere approximately equal to combined length of two more distal tarsomeres and with two parallel but often asymmetrical rows of small setae on plantar surface.

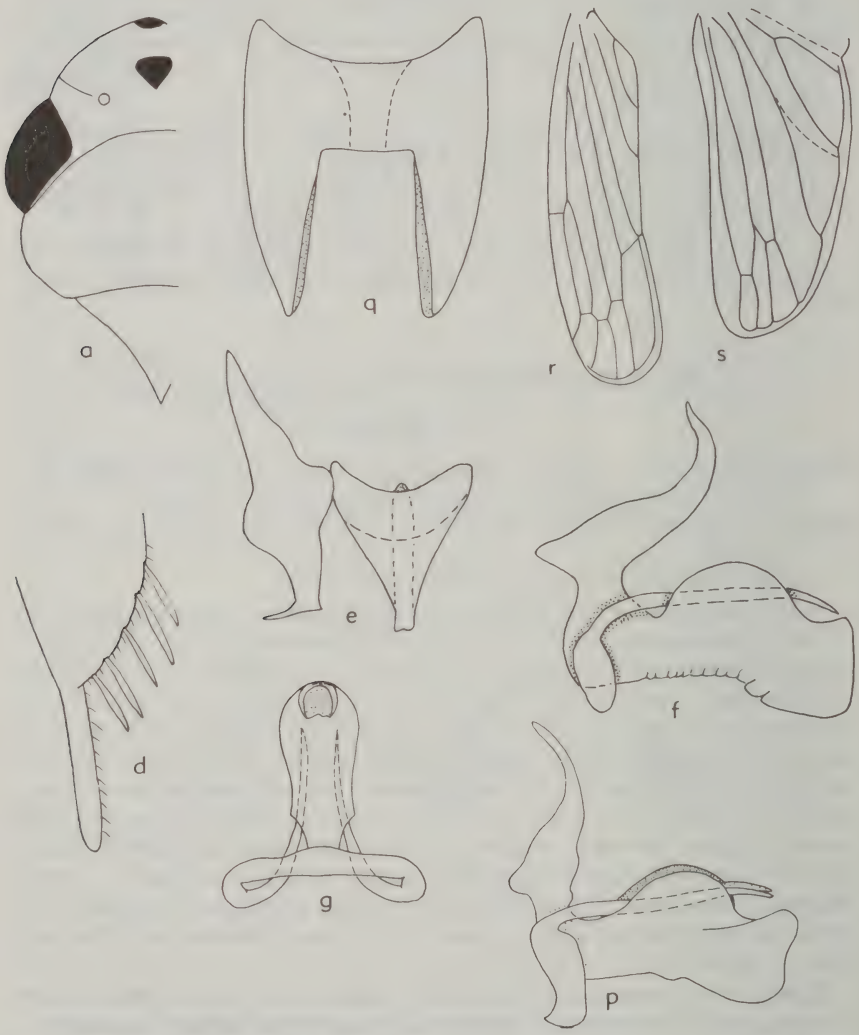


FIGURE 487.—*Plesiommata mollicella* (Fowler) (*a* from specimen from Loma Bonita, Mexico; *p* from Volcán, Panama; *g, q,* from "Rio Grande", Brazil; *r, s,* from Nova Teutonia, Brazil; remainder from São Paulo, Brazil): *q,* Male pygofer from dorsal view; *r,* forewing; *s,* hindwing.

Abdomen of male with conspicuous slender, often capitate basal apodemes.

Male genitalia: Pygofer moderately produced, posterior margin convex, with setae as in *Ciminius*. Plates not extending posteriorly as far as pygofer apex, varying interspecifically from gradually to abruptly tapered, with uniseriate macrosetae and with microsetae also. Style extending posteriorly approximately as far as apex of connective, foot-shaped apically. Connective Y-shaped; aedeagus short, with a pair of slender processes arising basiventrally and extending dorsally over shaft. Paraphyses absent.

Female (fig. 492) abdominal sternum VII short, with posterior margin transverse and rectilinear or slightly convex. Genital chamber without sclerites. Ovipositor with second valvula expanded beyond basal curvature, dorsal margin convex and bearing quadrate primary teeth from beginning of expanded portion almost to apex, the primaries, the dorsal anteapical, and the posteroventral margins bearing very minute secondaries. Pygofer with a number of macrosetae on apical one-third.

Specimens belonging to the genus *Plesiommata* occur from Canada, and eastern and central U.S.A. to Argentina. *Plesiommata* is related to *Ciminius* Metcalf and Bruner, but differs markedly in its lack of paraphyses in the male, in having three anteapical cells in the forewing, and in having conspicuous abdominal apodemes that are truncate apically.

P. corniculata, n. sp., has been collected on sweet potato in Ecuador, and on grasses by A. S. Costa, in Campinas, Brazil, and on avocado in the Panama Canal Zone by H. Morrison. Stearns (1927a:9) reported the food plant of *P. tripunctata* (Fitch) as oak in Virginia, and DeLong (1948a: 146) reported the same species from *Muhlenbergia* and "similar herbaceous plants" in Illinois. Mason and Yonke (1971b: 104) give additional plant species from which *tripunctata* was collected. *P. mollicella* (Fowler) was collected on grass in Costa Rica by C. H. Ballou.

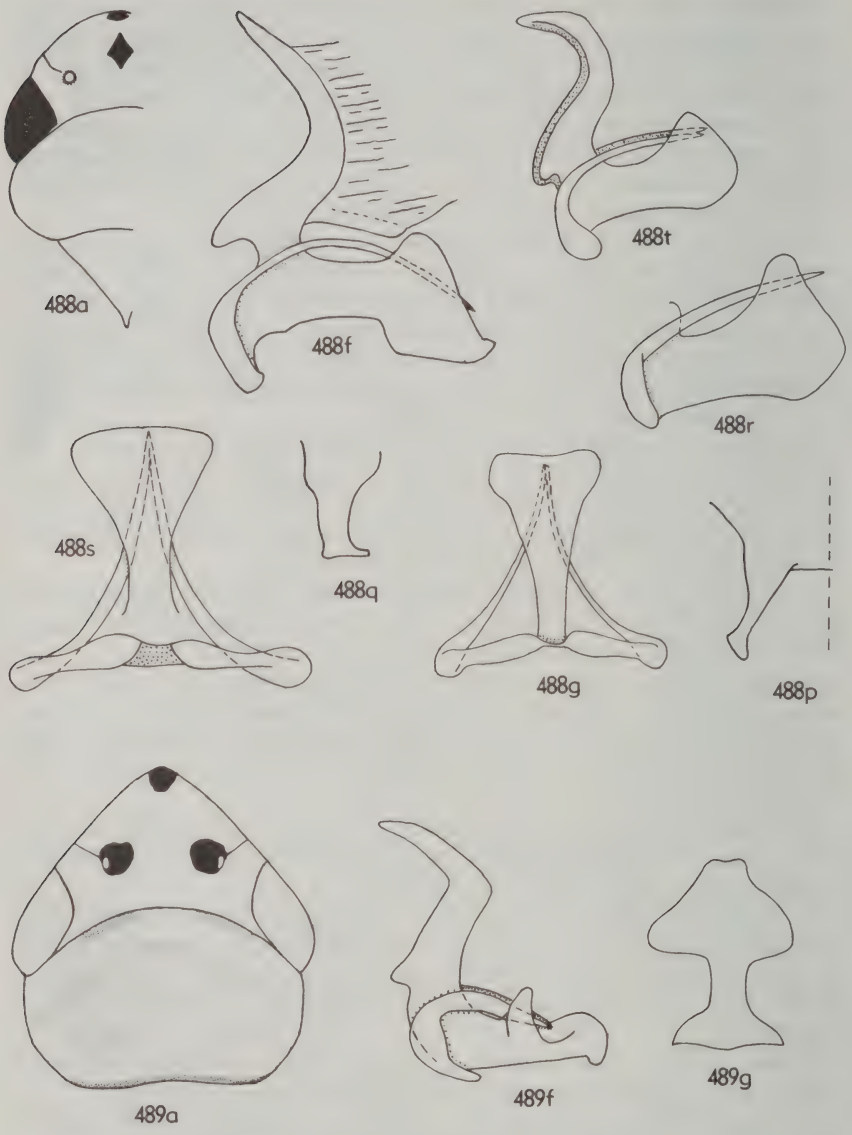
My identification of *P. alcorni* Beamer is based on a male paratype.

The genitalia of a male, compared with the female lectotype of *Tettigonia mollicella* Fowler, agreed well with figure 487*d, e, g, p*.

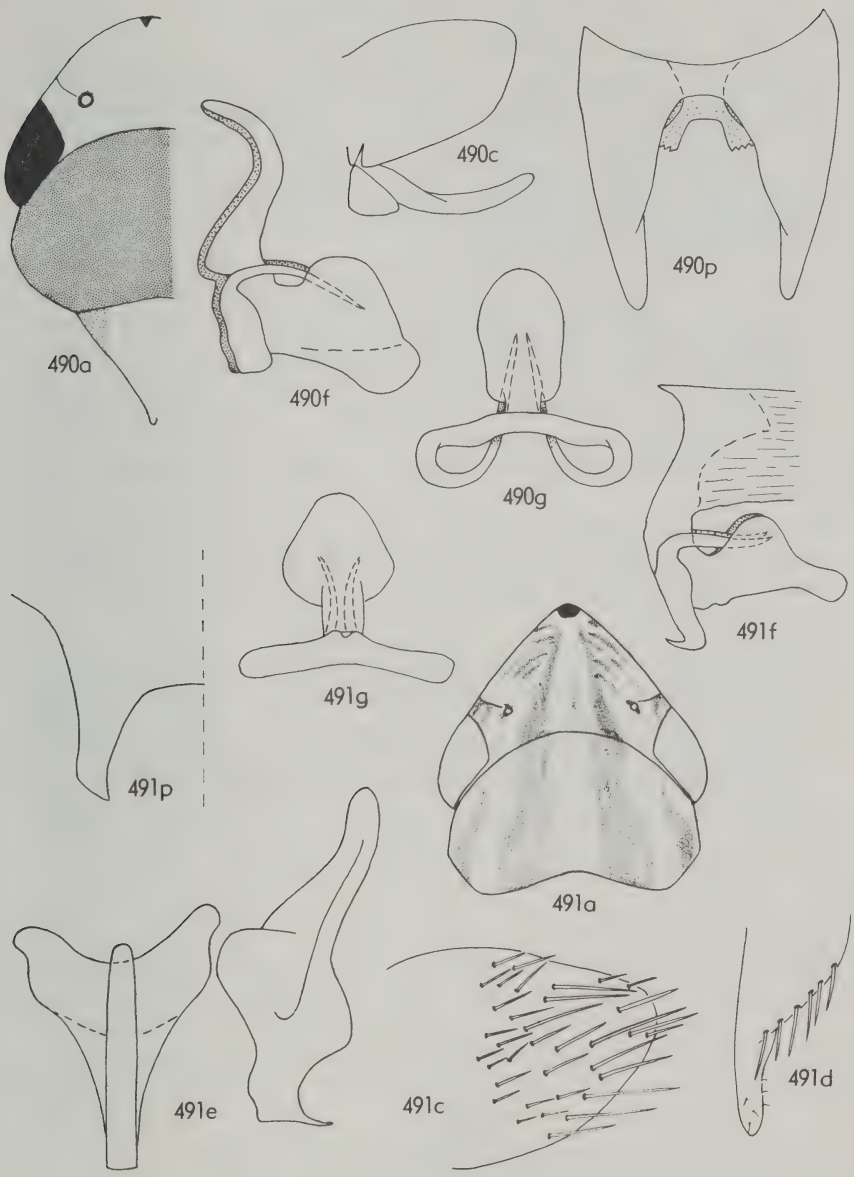
The female lectotype of *Tettigonia mollicula* Fowler does not agree entirely with my illustration (fig. 491*a*) of the head and thorax in that the anterolateral margins of the crown of the type are more convex and in that the apex of the crown is less acute in the type, but I consider these differences to be intraspecific.

I have not seen type material of *Tettigonia tripunctata* Fitch, and follow Oman, Ball, and other authors in their determination of this species.

Hamilton 1976a, because of discrepancies in Provancher 1889a, applied *Plesiommata* to a cercopid genus. The discrepancies he noted are actual, but this application of Provancher's name results in accepting an *Aphrophora* with "les jambes postérieures avec leur double rangée d'épines" — no less incongruous than the situation Hamilton sought to improve. I accept the nominal species *Tettigonia tripunctata* Fitch as type-species of *Plesiommata,* following other North American authors.



FIGURES 488, 489.—488, *Plesiommata corniculata*, n. sp. (*a* from specimen from Rio Caraguata, Mato Grosso, Brazil; *q*, *t*, from Grenada, B. W. I.; *r*, *s*, from São Paulo, Brazil; remainder from Trinidad, B. W. I.; part of anal tube shown in *f*: *p*, Sternal abdominal apodeme; *r*, *t*, aedeagus from lateral view; *q*, style apex from dorsal view; *s*, aedeagus from ventral view. 489, *P. tripunctata* (Fitch) (*a* from specimen from Crusoe, North Carolina; remainder from Louisville, Kentucky; aedeagal processes not shown in *g*).



FIGURES 490, 491.—490, *Plesiommata alcorni* Beamer (from specimen from Nayarit, Mexico; setae not shown in *c*): *p*, Male pygofer from dorsal view. 491, *P. mollicula* (Fowler) (*a* from specimen from Tubac, Arizona; remainder from Cuernavaca, Mexico; plate not shown in *c*; base of anal tube shown in *f*): *p*, Sternal abdominal apodeme.

SPECIES OF *PLESIOMMATA*

alcorni Beamer, 1953a:65. Mexico.

corniculata, n. sp. Mexico, Costa Rica, Panama, Colombia, Trinidad Is., Grenada (B. W. I.), Venezuela, Br. and D. Guiana to Bolivia, Paraguay, and S. Brazil.

mollicella (Fowler), 1900d:289 (*Tettigonia*). Mexico, Br. Honduras, Guatemala, Costa Rica, Panama, Colombia, Venezuela, Fr. Guiana, Ecuador, Bolivia, S. and SE. Brazil, Paraguay, Argentina.

mollicula (Fowler), 1900d:288 (*Tettigonia*), Arizona, Mexico, El Salvador.

tripunctata (Fitch), 1851a:55 (*Tettigonia*). E. North America.

biundulata Provancher, 1889a:264.

KEY TO MALES OF *PLESIOMMATA*

1. Crown of head with median black spot behind apex 2
   Crown with an apical black spot but no median spot behind it 3

2. Aedeagal shaft in lateral view with a dorsal expansion on each side near midlength ..... *mollicella* (Fowler) (fig. 487)
   Aedeagal shaft infundibulate, without an expansion at midlength
   corniculata, n. sp., page 601

3. Crown acutangularly produced, with a broad black area around each ocellus (North America) ..... *tripunctata* (Fitch) (fig. 489)
   Crown more broadly rounded, or without broad black area around each ocellus 4

4. Forewing with area between branches of R brown, dorsal aedeagal apodeme joined to tergum IX behind base of latter, aedeagal shaft narrower in caudoventral view ..... *alcorni* Beamer (fig. 490)
   Forewing with area between branches of R not so, dorsal aedeagal apodeme joined to tergum IX at base of latter, aedeagal shaft broader in caudoventral view ..... *mollicula* (Fowler) (fig. 491)

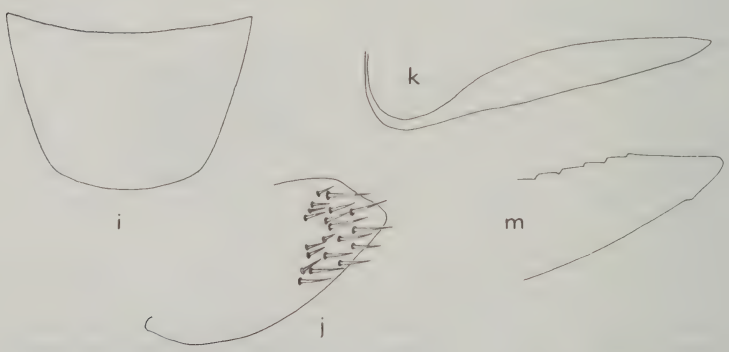


FIGURE 492,—*Plesiommata* sp. (from specimen from British Honduras).

Plesiommata corniculata, NEW SPECIES

FIGURE 488, PAGE 598

Length of male 3.6-4.1 mm, of female 4.0-4.9 mm. Head with median length of crown from slightly more than one-half to almost eight-tenths interocular width and from slightly less than one-third to four-tenths transocular width, apex of crown broadly rounded in dorsal view, ocelli in line with anterior eye angles. Male genitalia with plates gradually tapered in basal half, very slender in apical half; aedeagus in lateral view abruptly expanded at apex, in ventral view shaft in shape of a simple horn.

Color of dorsum dull pale stramineous, a narrow rim around each ocellus, a diamond-shaped median more anterior spot on crown, and the apex, black; pronotum with two transverse pale brown stripes, forewings with longitudinal veins brown; face irregularly marked with light brown and dull white.

Holotype male and a long series of specimens of both sexes, Rio "Caraguata", Mato Grosso, Brazil, March, 1953 (F. Plaumann) (NCS). A long series of specimens of both sexes from the following localities: Cojimies, Manabi, Ecuador, August, 1949 (W. Clark-Macintyre), on sweet potato; San Isidro del General, Costa Rica (D. L. Bounds); Cuernavaca, Morelos, Mexico, August 6, 1938 (L. J. Lipovsky) (NCS). Dutch Guiana, August, 1953 (J. M. B. van Dinther) (AMNH). Puerto Armuelles, Panama, December 4, 1939 (T. T. Howard); Gamboa, Panama C. Z., February 14, 1921, February 16, 1921 (J. G. Sanders); Alhajuela, Panama C. Z., February 11, 1921 (J. G. Sanders); Piracicaba, São Paulo, Brazil, September 6, 1964 (collector unknown), November 15, 1965 and December 26, 1964 (C. A. Triplehorn); "Guajara" Mirim, "Bolivia", February 13, 1943 (OSU). Tingo María, Peru, June 17, July 3, and July 6 (W. T. Van Velzen); from a number of Panama localities (F. S. Blanton) (USNM). Estancia Postillón, Puerto Max, Río Paraguay, N. Paraguay; Paramaribo, September, 1961 (J. Michaelis) (ZIMH). Monsón Valley, Peru, September 18, 1954 (E. I. Schlinger and E. S. Ross); Buenaventura, Colombia, August 31, 1954 (E. S. Ross) and November 2, 1950 (collector unknown) (CAS). Mount Gay Estate, British West Indies (H. H. Smith) (BM). Santa Cruz, Bolivia (J. Steinbach) Cumuto, Arepo, Trinidad, from Savanna, April, 1913 (R. Thaxter) (MCZ). Limón Province, Costa Rica (R. E. Woodruff) (FSPB). Aracataca, Colombia, February 12 (Ujhely) (HNHM). Holotype on indefinite loan to USNM.

P. corniculata, n. sp., is readily separable from all other species of the genus by the distinctive form of the aedeagus.

81. GENUS *HELOCHARA* FITCH

FIGURE 493

Helochara Fitch, 1851a:56. Type-species: *Helochara communis* Fitch, by monotypy.

Length of male 4.2-5.3 mm, of female 5.8-6.3 mm.

Crown, pronotum, scutellum, forewing to membrane, face, and thoracic pleura coarsely pitted. Head moderately triangularly produced, median length

of crown from slightly less than six-tenths to approximately eight-tenths interocular width and from slightly more than one-third to slightly less than one-half transocular width, anterior margin acutangular, apex usually not angular at transition from crown to face, ocelli located before a line between anterior eye angles, relative distance of ocellus from median line and adjacent anterior eye angle variable within species, surface of crown slightly concave medially before ocelli, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, angulate or carinate dorsally, each with anterior margin vertical and rectilinear or slightly concave; clypeus convex, muscle impressions distinct, lower portion of clypellus more nearly horizontal than remainder of profile of face, transclypeal suture obscure medially.

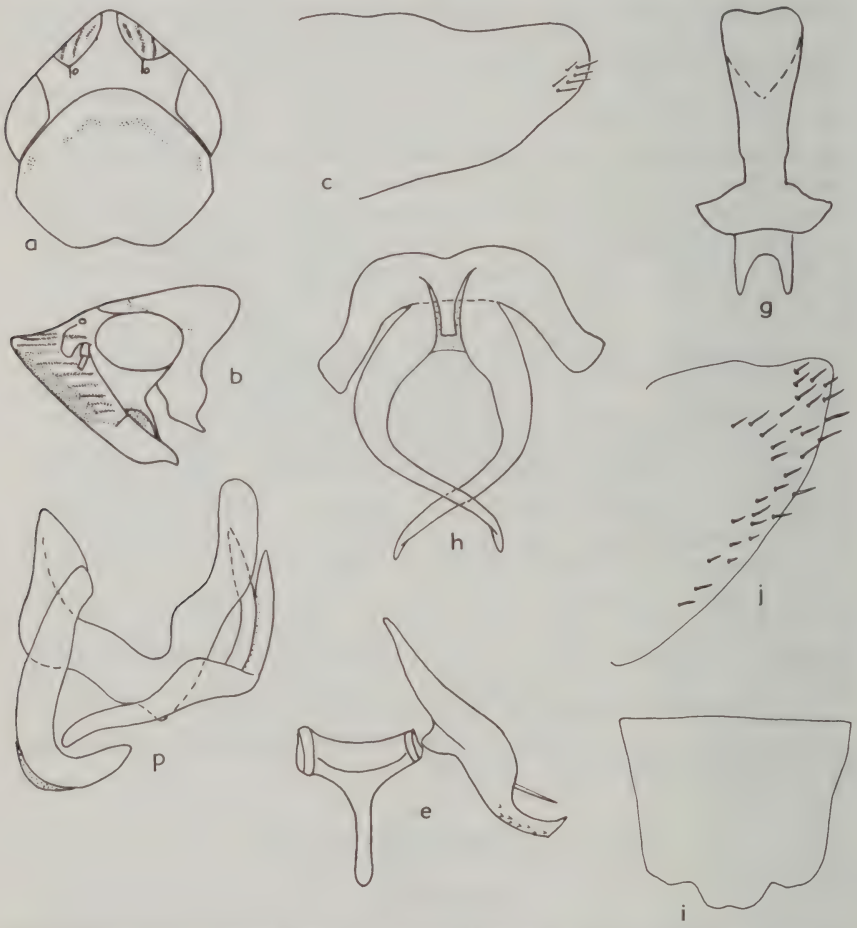


FIGURE 493.—*Helochara communis* Fitch (*h* from specimen from Forestville, California; *i, j,* from Kalama, Washington; remainder from Midland County, Michigan; plate not shown in *c; h* from ventral view): *p,* Aedeagus and paraphyses, from lateral view).

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae absent; posterior margin very short, concave. Forewing with membrane including all of inner apical cell and all of remaining three apical cells except their basal portions, extending proximad along costal margin to base of outer anteapical cell, veins elevated, distinct, with three closed anteapical cells, of which base of innermost is more distal than bases of others, apical cells and length of female wing as in *Cicadella* Latreille. Hindleg with femoral setal formula 2:0:0, first tarsomere with length less than combined length of more distal tarsomeres, plantar setae as in *Cicadella*.

Male pygofer moderately produced posteriorly and rounded apically, with a few very slender setae in apical half, without processes. Plates triangular, extending posteriorly beyond pygofer apex, their apices not weakly sclerotized, each with a few irregularly arranged elongate microsetae. Style extending posteriorly as far as apex of connective, with a preapical lobe, apex obliquely truncate. Connective Y-shaped with stem much longer than arms. Aedeagus short, symmetrical, not articulated with connective, without processes. Paraphyses short, symmetrical, crossed, not stalked.

Female genitalia much as described above for *Draeculacephala* Ball.

I have seen specimens of *Helochara* from British Colombia through California, Arizona, and New Mexico to Jalisco, Mexico, and from New York to Florida. *Helochara* is closely related to *Carneocephala* and *Draeculacephala* from both of which it may be distinguished readily by its conspicuous pits and by the lack of an anteapical plexus of veins in the forewings.

The type-species is able to transmit the Pierce's Disease pathogen. Mason and Yonke (1971b:114) summarized the plants from which this species has been collected.

Oman has described a western U. S. A. form as *Helochara delta*, But I have seen series within which the characters break down, and in view of this and the fact that the described differences were only slight, I treat this as a junior synonym of the type-species, the only species known to me. I have studied the lectotype of *Tettigonia herbida* Walker.

SPECIES OF *HELOCHARA*

communis Fitch, 1851a:56. B. Colombia to California, Arizona and New Mexico; Mexico; New York to Florida.

herbida (Walker), 1851b:769 *(Tettigonia)*.

delta Oman, 1943a:74. New synonymy.

82. SYNCHARINA, NEW GENUS

FIGURES 494-497

Type-species: *Tettigonia punctatissima* Signoret.

Length 3.5-6.4 mm.

Head moderately to well produced, median length of crown varying from slightly less than seven-tenths interocular width to slightly greater than interocular width, and from four-tenths to two-thirds transocular width, anterior

margin varying from obtusely to acutely angular in dorsal view, not angulate or carinate at transition from crown to face, ocelli located on or slightly before (*S. lineiceps* (Spinola)) a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown; surface longitudinally broadly *(lineiceps),* or narrowly (*S. linea* (Taschenberg)) foveate, or slightly concave between ocelli, surface coarsely punctate, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, their anterior margins rectilinear or concave, and vertical or oblique; face in profile slightly convex, clypeus seldom and then only slightly flattened medially, median area coarsely punctate, transclypeal suture rarely complete, lower portion of clypellus more nearly parallel to longitudinal axis of body than remainder of profile of face, face without pubescence.

Pronotum with width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carina present but incomplete, posterior margin concave; entire surface coarsely punctate, without pubescence; scutellum coarsely punctate. Forewing with membrane present but not abruptly delimited from remainder of surface, including all or only part (*linea* males) of apical cells, veins distinct and elevated, with four apical cells, the base of the fourth more proximal than base of third, central anteapical cell open basally, without an anteapical plexus of veins, texture of portion before membrane coriaceous, often with basal portion coarsely punctate; forewings of female at rest position exceeding apex of ovipositor.

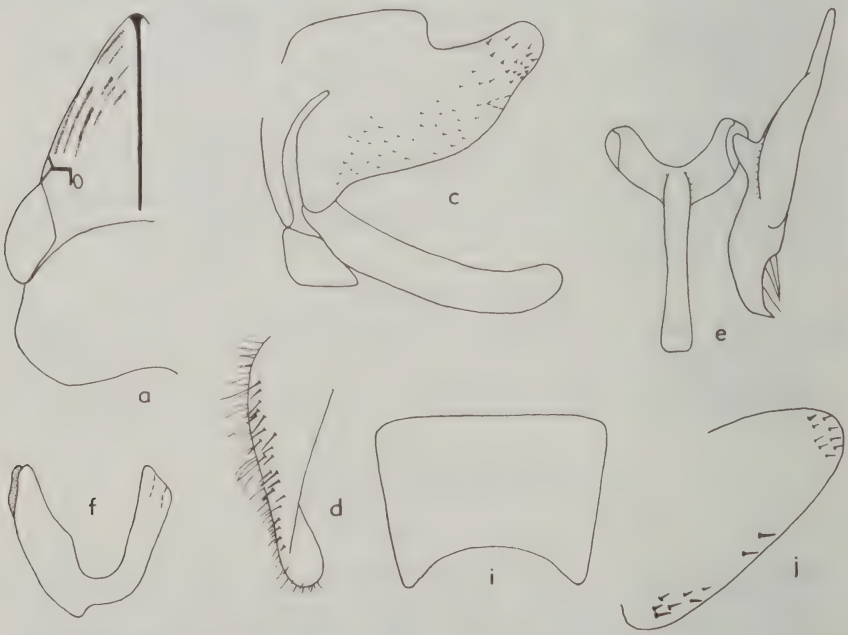


FIGURE 494.—*Syncharina linea* (Taschenberg) (*a* from holotype; *i, j,* from another specimen from Mendoza, Argentina; remainder from Argentina).

Hindleg with femoral setal formula most commonly 2:1:0, but also 2:0:0, 2:1:1 or 2:2:1; first tarsomere with length less than combined length of two more distal tarsomeres.

Male genitalia: Pygofer not strongly produced, narrowly rounded apically, with a small number of small macrosetae near posterodorsal margin, with a number of short microsetae more basally. Plates separate throughout their length, extending posteriorly at least as far as pygofer apex, each triangular, each with a longitudinal row of small macrosetae (exception: *linea* in which the plates have numerous scattered elongate microsetae). Style not extending posteriorly as far as apex of connective, with preapical lobe, apex obliquely truncate. Connective Y-shaped, with stem much longer than arms. Aedeagus short, symmetrical, without processes. Paraphyses present, paired, symmetrical, not stalked.

Female abdominal sternum VII with posterior margin slightly produced and convex, or regularly and slightly concave *(linea)*. Genital chamber without

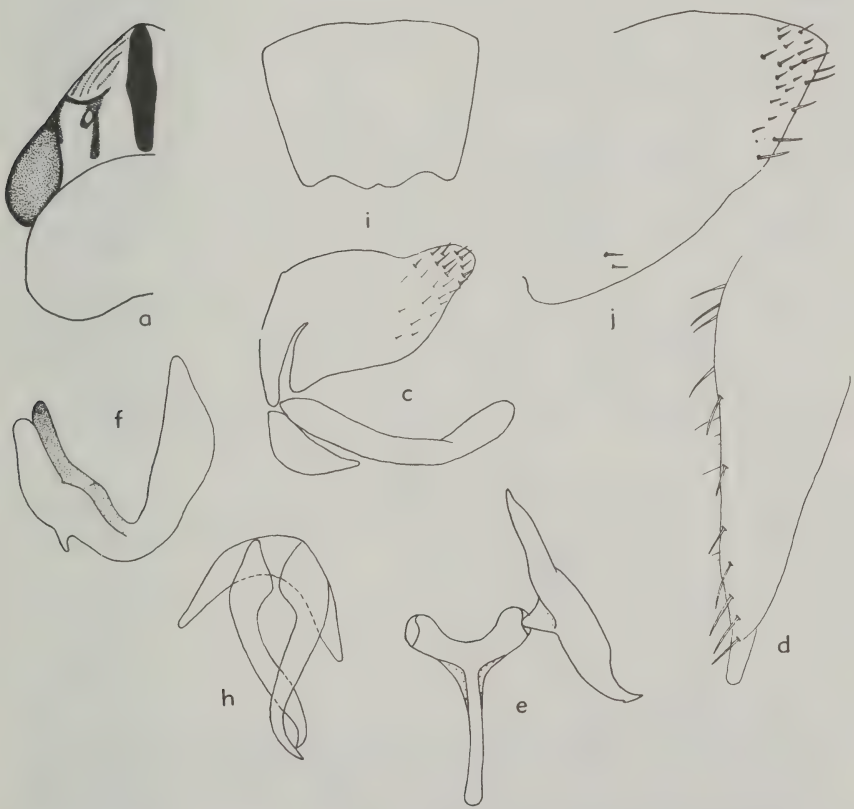
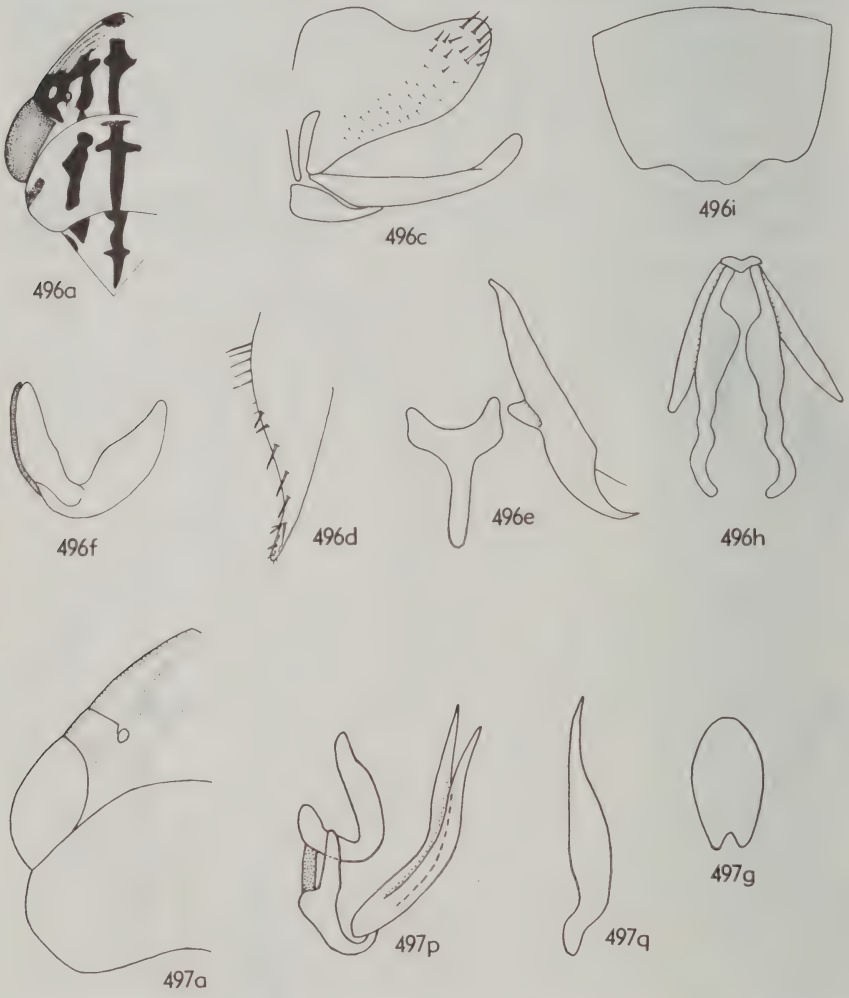


FIGURE 495.—*Syncharina lineiceps* (Spinola) (*i, j,* from specimen from Chile; remainder from Santiago, Chile; *h* from caudoventral view).

sclerites. Ovipositor with second valvulae as in *Cicadella* Latreille. Pygofer with several anteapical small macrosetae and a few additional ones near postero-ventral margin.

Species of *Syncharina* occur in northern and central Bolivia, southern Brazil, northern and southern Argentina and central Chile. The genus is closely related to *Helochara* Fitch in the pitting of the anterior dorsum. It differs



FIGURES 496, 497.—496, *Syncharina punctatissima* (Signoret) (*a* from specimen from Argentina; *i* from Tucumán, Argentina; remainder from Loreto, Misiones, Argentina; *h* from ventral view). 497, *S. argentina* (Berg) (from specimen from Buenos Aires, Argentina, labeled "type"; only aedeagal shaft shown in *g*): *p*, Aedeagus and paraphyses, from lateral view; *q*, one ramus of paraphyses from ventral view.

notably from *Helochara* in that the central anteapical cell of the forewing is open basally. It belongs unquestionably to the group of genera related to *Cicadella* Latreille. It may be closely allied to *Helocharina* Melichar, also (see discussion of that genus).

A series of specimens of *S. punctatissima* (Signoret), taken on Pangola grass in São Carlos, Brazil, were sent to me by Eng°. Max de Menezes. I have examined a series of *S. punctatissima* (Signoret) from Cochabamba, Bolivia, collected on wheat by B. A. Haws, of the USAID program in Bolivia.

My identification of *S. argentina* (Berg) is based on a specimen from the Berg collection in Museo La Plata, Argentina, labeled with the specific name and "copiada". My interpretation of *Tettigonia linea* Taschenberg is based on a study of the holotype (undoubtedly a female, although the abdomen was missing) and a later study of specimens from the Moravian Museum in Brno and from the U. S. National Museum which agree closely with my illustration of the holotype.

My identification of *S. lineiceps* (Spinola) is based on a photograph of one of the two specimens in the Spinola collection in Tassarolo Castle, Italy. I am greatly indebted to Dr. Carlo Vidano for sending the photo. I have studied numerous specimens from Chile agreeing with the photograph. Ball (1901e:65) illustrated a specimen of *Graphocephala rufimargo* (Walker) as *lineiceps*.

My interpretation of *Tettigonia punctatissima* Signoret rests on an examination, and drawing, of the holotype in the Naturhistorisches Museum in Vienna. The genitalia of this female were too covered with mold to illustrate, but the illustrations of the head have been sufficient to identify the species.

SPECIES OF *SYNCHARINA*

argentina (Berg), 1879d:251 (*Tettigonia*). S. Brazil, N. and S. Argentina, New combination.
linea (Taschenberg), 1884a:451 (*Tettigonia*). Argentina, New combination.
lineiceps (Spinola), 1852a:283 (*Tettigonia*). Central Chile, New combination.
chilensis (DeLong), 1967a:184 (*Draeculacephala*). New synonymy.
punctatissima (Signoret), 1854a:16 (*Tettigonia*). S. Brazil, N. Argentina, N. and Central Bolivia. New combination.

KEY TO SPECIES OF *SYNCHARINA*

1. Specimens longer, length 7.3-8.4 mm, male plates with numerous multiseriate microsetae, without uniseriate macrosetae
linea (Taschenberg) (fig. 494)
Specimens shorter, length 3.5-6.7 mm, male plates with uniseriate small macrosetae 2

2. Color of forewing deep green with veins concolorous
lineiceps (Spinola) (fig. 495)
Color of forewing black with veins concolorous, or greenish tan with most veins usually (but at least claval suture) black 3

3. Male with paraphyses forcipate in ventral view; pronotum with a median black line ..... *punctatissima* (Signoret) (fig. 496)
Male with paraphyses not forcipate; pronotum without a median black black line ..... *argentina* (Berg) (fig. 497)

83. Genus HELOCHARINA Melichar

Figures 498, 499

Helocharina Melichar, 1926a:343. Type-species: *Tettigonia gayi* Spinola, by subsequent designation of China, 1938d:184.

Length of male 6.0-6.3 mm, of female 6.4-6.8 mm.

Head moderately produced, with median length of crown from slightly more than one-half to three-fourths interocular width and from one-third to almost one-half transocular width; anterior margin narrowly rounded in dorsal view, not angulate or carinate at transition from crown to face, ocelli on a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, surface shallowly concave between ocelli or not and often with a few punctations near ocelli, lateral clypeal sutures extending onto crown but not attaining ocelli; antennal ledges not protuberant, in lateral view with their anterior margins convex and oblique; face in profile slightly convex, clypeus flattened medially or not, median area punctate or not, transclypeal suture indistinct medially, lower portion of clypellus more nearly horizontal than upper portion or continuing profile of clypeus, face without pubescence.

Pronotum with width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave, disk transversely rugose, not punctate, without pubescence; scutellum usually weakly transversely rugose behind transverse sulcus. Forewing with membrane including only inner apical cell, veins distinctly contrastingly paler than remainder of wing, venation at apex variable interspecifically, with or without an anteapical plexus of veins, texture coriaceous, basal portion not punctate; wings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length approximately equal to combined length of two apical tarsomeres, with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced and rounded posterodorsally, without processes, with a number of macrosetae on apical half. Plates slender, triangular, extending posteriorly as far as or farther than pygofer apex, with chaetotaxy variable interspecifically. Style extending posteriorly beyond apex of connective, with a distinct preapical lobe. Connective Y-shaped or trapezoidal. Aedeagus short, regularly curved posterodorsad, without processes. Paraphyses Y-shaped, symmetrical or not (variable interspecifically).

Female abdominal sternum VII with posterior margin moderately to very strongly produced posteriorly. Genital chamber without sclerites. Ovipositor with dorsal sloping primary teeth occurring on margin beyond basal curvature, the teeth fairly close together in apical half, variable interspecifically nearer base, each of the primary teeth bearing a number of secondaries, apex of each second valvula narrowly rounded and with minute anteapical dorsal denticles. Pygofer moderately produced, gradually or abruptly rounded apically, with a number of macrosetae on apical half.

Helocharina Melichar is known from the type-species and the new species described below, both from Chile. Specimens available to me have been

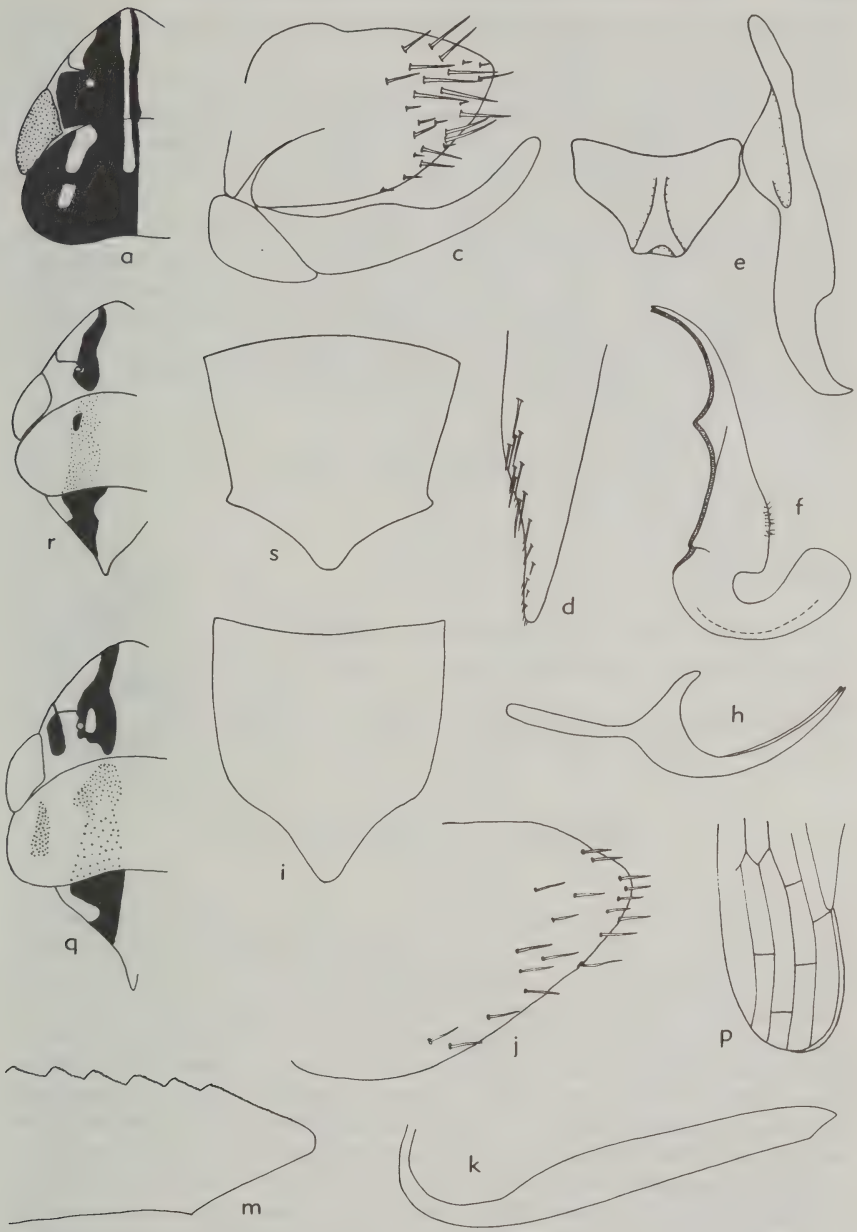


FIGURE 498.—*Helocharina gayi* (Spinola) (*i-k, m, q,* from specimen from S. of Valdivia, Chile; *r, s,* from female lectotype of *Tettigonia albinervosa* (Signoret); remainder from Arauco Province, Chile; *h* from lateral view; *i* from macerated specimen): *a,* Anterior dorsum, male; *p,* apex of forewing; *q, r,* anterior dorsum, female; *s,* female abdominal sternum VII, unmacerated.

collected between 33° and 41° South Latitude, in the provinces of Santiago, Malleco, Arauco, and Valdivia.

Helocharina is similar to *Syncharina* in many ways. It may be separated from the latter by its lack of punctation on the pronotum, and scutellum, and by its stalked paraphyses in the male, both differing from *Syncharina*. I confused these genera early in the progress of this work and returned a number of specimens with erroneous generic names on the labels.

My identification of *H. gayi* (Spinola) is based on photographs of a female specimen from the Spinola collection in Tassarolo Castle, Italy. I am greatly indebted to Dr. Carlo Vidano for making the photographs available. I have associated these photographs, with the aid of the original description, with a series of specimens at hand. The specific synonymy has resulted from a study of the lectotype of *Tettigonia albinervosa* Signoret, which Signoret himself identified with *albonervosa* Spinola.

SPECIES OF *HELOCHARINA*

gayi (Spinola), 1852a:285 (*Tettigonia*). Chile.
albonervosa (Spinola), 1852a:284 (*Tettigonia*).
albinervosa (Signoret), 1854a:25 (*Tettigonia*).
vidanoi, n. sp. Chile.

KEY TO SPECIES OF *HELOCHARINA*

Forewing without an anteapical plexus of veins; male with paraphyses symmetrical ..... *gayi* (Spinola) (fig. 498)
Forewing with an anteapical plexus of veins; male with paraphyses asymmetrical ..... *vidanoi*, n. sp.

Helocharina vidanoi, NEW SPECIES

FIGURE 499

Length of male 6.0-6.1 mm, of female 6.5-6.7 mm. Head with median length of crown varying from slightly more than one-half to two-thirds interocular width, and from one-third to slightly more than four-tenths transocular width; face with clypeus not flattened medially, lower portion of clypellus continuing profile of clypeus. Forewing with an anteapical plexus of veins. Male plates not extending posteriorly as far as pygofer apex, without conspicuous anteapical setae but with a pair of elongate slender setae at apex; paraphyses with apical half not lying in median plane, rami limited to apical portion of apical half. Female abdominal sternum VII strongly produced posteriorly, gradually narrowed to bluntly angulate apex; dorsal teeth of second valvulae of ovipositor more widely spaced than in *H. gayi* (Spinola).

Color of male crown mostly black on disk with arcuate ferruginous area on anterolateral margins on each side near apex and before each eye, disk with a median apical lobate (trilobed, or sagittate with base bilobed) marking, a pair of median basal linear or L-shaped markings, an oval marking including each ocellus, variable additional markings, dull, yellow; crown of female ferruginous with pale markings variable, in some specimens as in male, in others

differing in that median pale markings are more extensive. Pronotum with background ferruginous or black, or with a mixture of these, with variable paler mottling. Scutellum with a median pale stripe, interrupted or not, in some specimens margined with black; in some specimens with a black spot on anterior margin on each side near basal angle. Forewings fuscous to ferruginous, veins paler (usually contrastingly so). Clypeus yellow or yellow with orange suffusions, muscle impressions partly black, with a median black spot between clypeus and clypellus, a median black spot on clypellus in some specimens, and with variable black markings on genae. Thoracic pleura variably marked; legs pale yellow.

Holotype male and two females, El Clarillo, Chile, November 19, 1963, 800-1500 m. (L. E. Peña) (NCS). One male and two females, Quebrada de la Plata, near Maipú, 33°30′ S., 70°55′ W., 510 m., Santiago Province, Chile, October 30, 1966 (E. I. Schlinger); one female, same data except date which is October 3, 1966; four males and two females, same data except date which is October 22, 1966, elevation which is 755 m., and collector (M. E. Irwin);

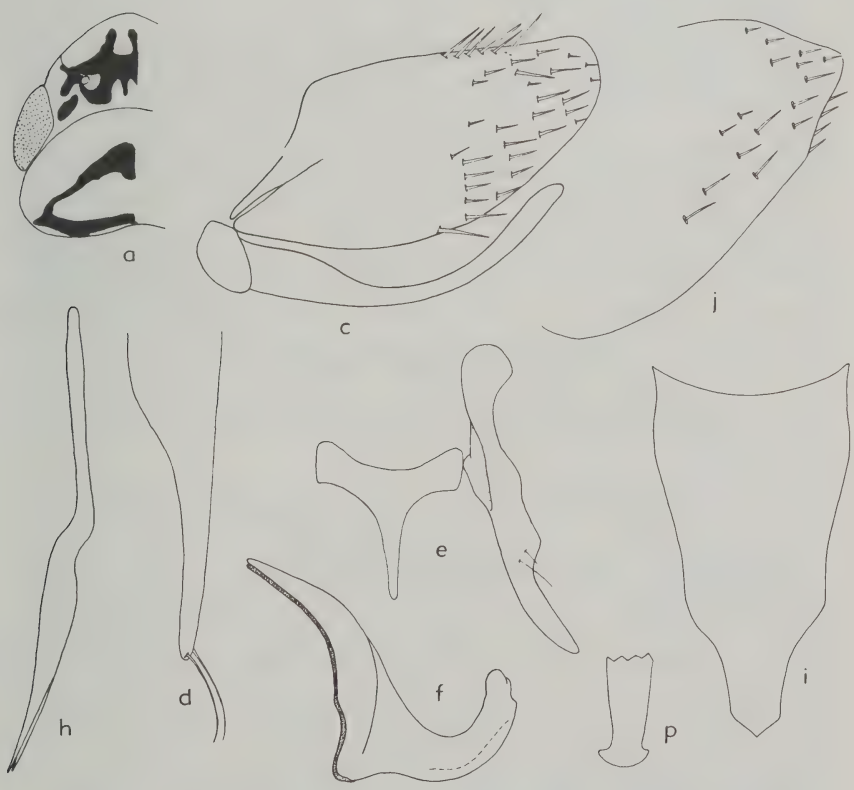


FIGURE 499.—*Helocharina vidanoi*, n. sp. (*i*, *j*, from topotype; remainder from holotype; *h* from dorsal view): *p*, Style apex from lateral view.

one female, same data except longitude which is 70°47′ W., date which is October 17, 1966, and elevation which is 510 m.; one male and one female, Quebrada de la Plata, Rinconada, Maipú, 33°31′ S. – 70°47′ W., 775 m., August 24, 1966 (M. E. Irwin); one female with same data except date, August 22, 1966, and two females same data except October 2, 1966 (all Riverside).

The species is named in honor of Dr. Carlo Vidano, whose cooperation has been most generous and most helpful.

Helocharina vidanoi, n. sp. is readily separated from *H. gayi* (Spinola) by the plexus of veins in the forewing, which is absent in *gayi*, and by the asymmetrical paraphyses.

84. Genus ORAGUA Melichar

Figures 500-525

Oragua Melichar, 1926a:344. Type-species: *Tettigonia nebulosa* Signoret by subsequent designation of China, 1938d:184.

Length 5.2-10.7 mm.

Head slightly produced, with median length of crown varying from one-third to slightly less than six-tenths interocular width and from slightly more than one-fifth to slightly less than four-tenths transocular width, anterior margin obtusely rounded in dorsal view, not angulate nor carinate at transition from crown to face, ocelli located on or slightly before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, surface convex, without fovea, usually coarsely punctate (exception: *O. stylata* (Signoret), and *O. yuracensis*, n. sp.), lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, not carinate, their anterior margins vertical or oblique and varying from rectilinear or slightly concave to convex; face in profile slightly convex, clypeus not or scarcely flattened medially, median area conspicuously punctate (exception: *stylata*), lower portion of clypellus continuing profile of clypeus or more strongly oblique, face usually without pubescence, transclypeal suture complete or not.

Pronotum with width less than transocular width of head, lateral margins parallel or very slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave; surface punctate (exceptions: *stylata*, and *yuracensis*) and also rugose in some species, without pubescence; scutellum punctate, transversely rugose, or without sculpturing (varying interspecifically). Forewing with membrane including at least inner apical cell, membrane abruptly delimited or not from remainder of surface, veins distinct and elevated, with four apical cells of which the base of the fourth is almost always located more proximally than base of third, without an anteapical plexus of veins, texture of portion before membrane coriaceous and often punctate; forewings of female at rest position exceeding apex of ovipositor or not. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, first tarsomere with length equal to or greater than combined length of two more distal tarsomeres and with two longitudinal

groups (regular rows or with one row irregular) of small setae on plantar surface.

Male pygofer weakly produced, with posterior margin usually very broadly rounded, with numerous macrosetae (macrosetae and microsetae in *O. hebeta,* n. sp. and *O. partitula* (Jacobi)) distributed over most of surface except basidorsally, or limited to apical one-half, pygofer processes absent (exception: *partitula*). Plates separate throughout their length, their posterior extent variable interspecifically with relation to apex of pygofer, each triangular, with arrangement of macrosetae usually uniseriate. Style extending posteriorly to a variable distance compared with apex of connective, with or without preapical lobe, apex varying interspecifically. Connective Y-shaped. Aedeagus very variable interspecifically, but usually with conspicuous basidorsal and basiventral apodemes. Paraphyses present or absent.

Female (unknown in many of the species) abdominal sternum VII with posterior margin transverse or moderately produced posteriorly and acute or slightly concave at apex. Genital chamber with or without one or more sclerites. Ovipositor with second valvula broadened throughout portion beyond basal curvature and bearing primary teeth on dorsal margin, each of which bears minute secondary denticles, apex acute, with anteapical dorsal and ventral denticles. Pygofer narrowly rounded posterodorsally, with a number of irregularly arranged macrosetae in a diagonal group parallel to posteroventral pygofer margin.

Specimens of *Oragua* Melichar are opaque black or fuscous, often with paler markings in the form of spots, marked with orange spots in some species.

Specimens belonging to *Oragua* have been examined from Southern Mexico, Guatemala, Honduras, El Salvador, the Guianas, northern, central, and southern Brazil, Ecuador, Peru, Bolivia, and Argentina. Nothing is known of the biology of the species.

ORAGUA GENERIC GROUP

84. Oragua
85. Acrulogonia
86. Tubiga
87. Selvitsa
88. Scoposcartula
89. Schildola
90. Jakrama
91. Trachygonalia
107. Aguahua

Oragua Melichar belongs to a group of genera that I have not been able to characterize because of species diversity within several of the genera. The complex includes *Acrulogonia, Tubiga, Selvitsa, Scoposcartula, Schildola,* and *Trachygonalia,* all described below. Of these, *Oragua* is most similar to

Acrulogonia and *Tubiga*. Pygofer processes are absent in males of *Oragua*, except *O. partitula* (Jacobi); present in *Acrulogonia*. Setae are more numerous on the male pygofer of *Oragua* than in species of *Acrulogonia*. The clypeus is punctate in *Oragua*, except in *O. stylata* (Signoret); granular in all species of *Acrulogonia*. The crown is coarsely punctate in *Oragua*, except in *stylata* and *yuracensis*, n. sp.; without punctures in *Acrulogonia*. The forewings are strongly opaque in *Oragua*, usually translucent in *Acrulogonia*.

My interpretation of *Tettigonia congruens* Fowler is based on a study of the male lectotype and a single male specimen agreeing with my illustrations of the lectotype. The additional specimen was intercepted on an orchid by the USDA at Brownsville, Texas, in 1966. It differs in the apices of the paraphyses (fig. 523*p*).

The present interpretation of *Cicadella discoidula* Osborn is based on my examination of the holotype.

The lectotype of *Tettigonia nebulosa* Signoret is a female from Pernambuco, Brazil. Although it has served to make clear the identity of the genus, I have not been able to identify it with any of the other species included here. From the Melichar collection in Brno, I have examined two specimens determined as *nebulosa* by him; one from Pozuzo, Peru without an abdomen, the other a female from Bella Vista, Brazil and near *O. obscura* (Schröder). Specimens labeled "nebulosa" by Osborn belong to the species treated here as *O. osborni*, n. sp., but neither Melichar's specimens nor Osborn's were from the type-locality or very near it, as far as I can learn (but see type-locality of *osborni* (below)).

The type of *Cicadella notulatula* Osborn in CM is an anomaly of doubtful sex. It is close to *O. discoidula* (Osborn).

The type of *Tettigella obscura* Schröder agrees with the illustrations here (fig. 518). I have identified *Tettigoniella partitula* Jacobi in the sense of the female lectotype. My interpretation of *Tettigonia stylata* Signoret is based on specimens from northern Brazil agreeing with Signoret's illustration and with sketches I made of the female lectotype. The paraphyses of this species are variable.

My interpretation of *Tettigonia variolosa* Signoret is based on a study of the male lectotype.

Tettigonia velutina Fowler is known to me only from the female lectotype, and a female compared with the lectotype.

SPECIES OF *ORAGUA*

alvarengai, n. sp. N. Brazil.
bakeri, n. sp. SE. Brazil.
bousemani, n. sp. Bolivia.
congruens (Fowler), 1899e:252 (*Tettigonia*). Mexico, Panama.
discoidula (Osborn), 1926b:178 (*Cicadella*). S. Brazil, Paraguay, Argentina. New combination.
elegantula, n. sp. N. Brazil.
furva, n. sp. Argentina.
galerula, n. sp. D. and Fr. Guiana, N. Brazil.
gregoirei, n. sp. Ecuador.
hebeta, n. sp. S. Brazil.

hualla, n. sp. Peru.
insipida, n. sp. Venezuela, Br. and Fr. Guiana, Brazil.
jurua, n. sp. Centr. Brazil.
maculifera, n. sp. SE. Brazil.
maculipes (Signoret), 1855d:791 (*Tettigonia*). E. Brazil.
nebulosa (Signoret), 1854b:343 (*Tettigonia*). NE. Brazil.
notulatula (Osborn), 1926b:179 (*Cicadella*). Bolivia. New combination.
nusinasa, n. sp. Peru.
obscura (Schröder), 1959a:65 (*Tettigella*). S. Mexico, Guatemala, Honduras, El Salvador. New combination.
osborni, n. sp. Brazil.
partitula (Jacobi), 1905c:172 (*Tettigoniella*). Peru, Bolivia. New combination.
pucallpensis, n. sp. Peru.
repetita, n. sp. Centr. Brazil.
schmidti, n. sp. Brazil.
stylata (Signoret), 1854b:344 (*Tettigonia*). N. Brazil.
triplehorni, n. sp. S. Brazil.
variolosa (Signoret), 1854b:341 (*Tettigonia*). French Guiana.
velutina (Fowler), 1899e:251 (*Tettigonia*). Panama.
yuracensis, n. sp. Peru.

KEY TO MALES OF *ORAGUA*

(*O. velutina* (Fowler) *O. nebulosa* (Signoret), and *O. notulatula* (Osborn) are not included)

1. Crown of head without sculpturing 2
   Crown of head punctate 6

2. Style short and broadly truncate at apex, not extending as far as apex of connective ..... *bakeri,* n. sp., page 643
   Style not broadly truncate apically, extending beyond apex of connective 3

3. Aedeagal shaft very short and very broad ..... *hualla,* n. sp., page 621
   Aedeagal shaft not as above 4

4. Paraphyses forcipate apically ..... *stylata* (Signoret) (fig. 500)
   Paraphyses not so 5

5. Pygofer with macrosetae few; face pale, forewings with a conspicuous pale spot on corium opposite midlength of clavus *jurua,* n. sp., page 618
   Pygofer with macrosetae numerous; face dark, forewings without a pale spot ..... *yuracensis,* n. sp., page 620

6. Aedeagus with shaft very slender and with slender apical procurved processes (figs. 504*f* and 505*f*) 7
   Aedeagus with shaft broader, apical processes shorter or broader, if present 8

7. Plates extending as far posteriorly as pygofer apex *maculifera,* n. sp., page 623
   Plates not extending as far posteriorly as pygofer apex *maculipes* (Signoret) (fig. 505)

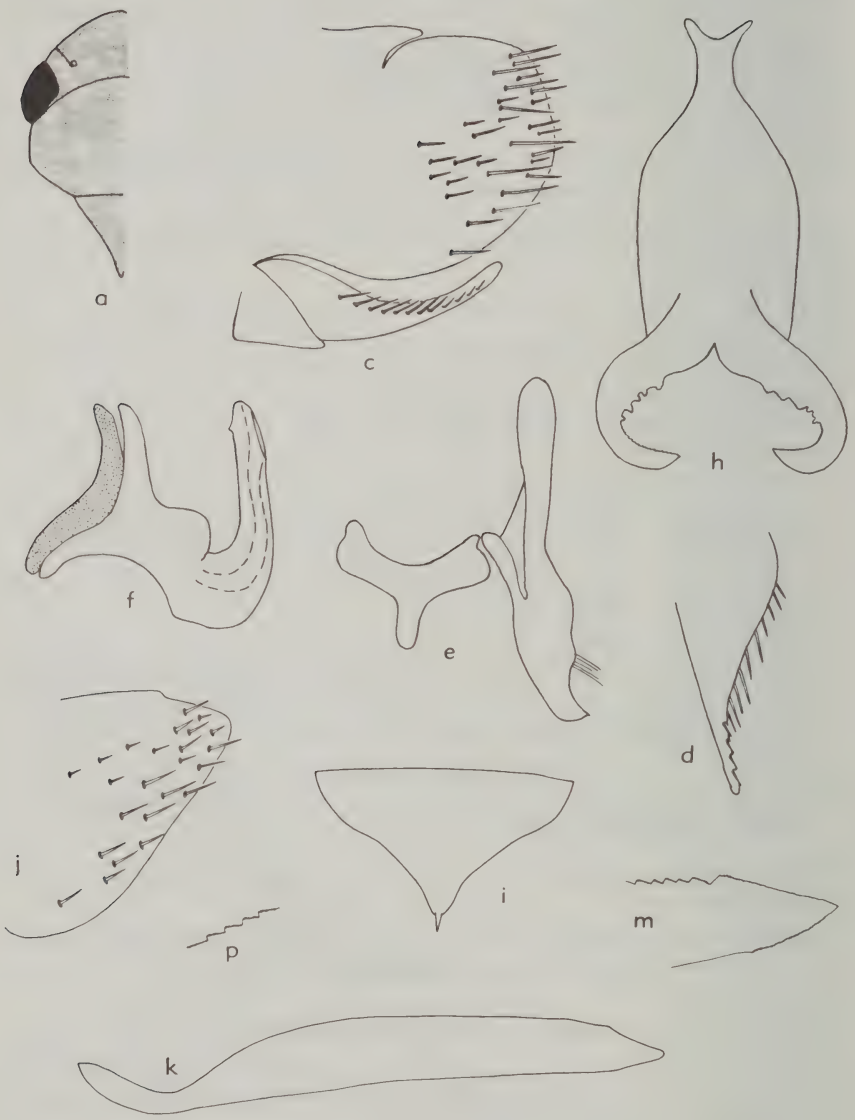


FIGURE 500.—*Oragua stylata* (Signoret) (*a* from specimen from French Guiana; *j, k, m, p,* from Territorio Amapá, Brazil; *i* from lectotype; remainder from Serro do Navio, Brazil; *h* from dorsal view): *p,* Basalmost teeth of second valvula.

8. Crown of head with orange spots 9
Crown of head without orange spots 13

9. Plates extending posteriorly as far as or farther than pygofer apex; aedeagus with an anteapical convexity which bears a pair of short decurved processes ..... *pucallpensis,* n. sp., page 623
Plates not extending posteriorly as far as pygofer apex; aedeagus with neither an anteapical convexity nor paired ventral processes 10

10. Crown with middle of disk black; connective not exceeding style apex; aedeagus with paired apical processes 11
Crown with paler markings in middle of disk; connective exceeding style apex; aedeagus without apical processes 12

11. Aedeagus with apical processes elongate, slender and not procurved *variolosa* (Signoret) (fig. 507)
Aedeagus with apical processes short and procurved (fig. 509*f*) *galerula,* n. sp., page 625

12. Crown with a V-shaped yellow median marking; aedeagus with shaft more strongly curved dorsad (fig. 510*f*) .... *alvarengai,* n. sp., page 628
Crown with a larger median orange spot; aedeagus with shaft less strongly curved dorsad (fig. 511*f*) ..... *elegantula,* n. sp., page 630

13. Genitalia without paraphyses 14
Paraphyses present 18

14. Aedeagus slender, tapering, without processes 15
Aedeagus with one or a pair of ventral anteapical processes 16

15. Total length 5.6 mm; pygofer of male with a short process *furva,* n. sp., page 635
Total length 6.9 mm or more; pygofer process absent *discoidula* (Osborn) (fig. 516)

16. Aedeagus with elongate procurved processes arising near midlength of shaft ..... *hebeta,* n. sp., page 639
Aedeagus with process or processes anteapical and ventral 17

17. Aedeagus with a single anteapical ventral process; male plates with uniseriate microsetae (Mexico and Central America) *obscura* (Schröder) (fig. 518)
Aedeagus with anteapical ventral process forked apically; male plates with multiseriate macrosetae (Bolivia and S. Brazil) *triplehorni,* n. sp., page 635

18. Dorsum dull orange with transverse black stripes 19
Dorsum without transverse stripes 20

19. Length more than 10 mm; transverse stripe across wings at midlength narrower; dorsal anteapical processes longer and more slender *gregoirei,* n. sp., page 637
Length less than 10 mm; transverse stripe across wings at midlength broader; dorsal anteapical processes shorter and broader *partitula* (Jacobi) (fig. 519)

20. Face heavily marked with black 21
Face yellowish-orange, dark markings absent or restricted to muscle impressions ..... *insipida*, n. sp., page 633

21. Scutellum transversely rugose, paraphyses slightly asymmetrical, pygofer with a short apical process extending mesally
schmidti, n. sp., page 640
Scutellum punctate, paraphyses symmetrical, pygofer without a process 22

22. Styles broadly truncate apically 23
Styles not truncate apically 24

23. Forewing with large orange markings; length less than 9 mm
bousemani, n. sp., page 631
Forewing with small yellowish to ivory spots; length 10 mm or more
nusinasa, n. sp., page 631

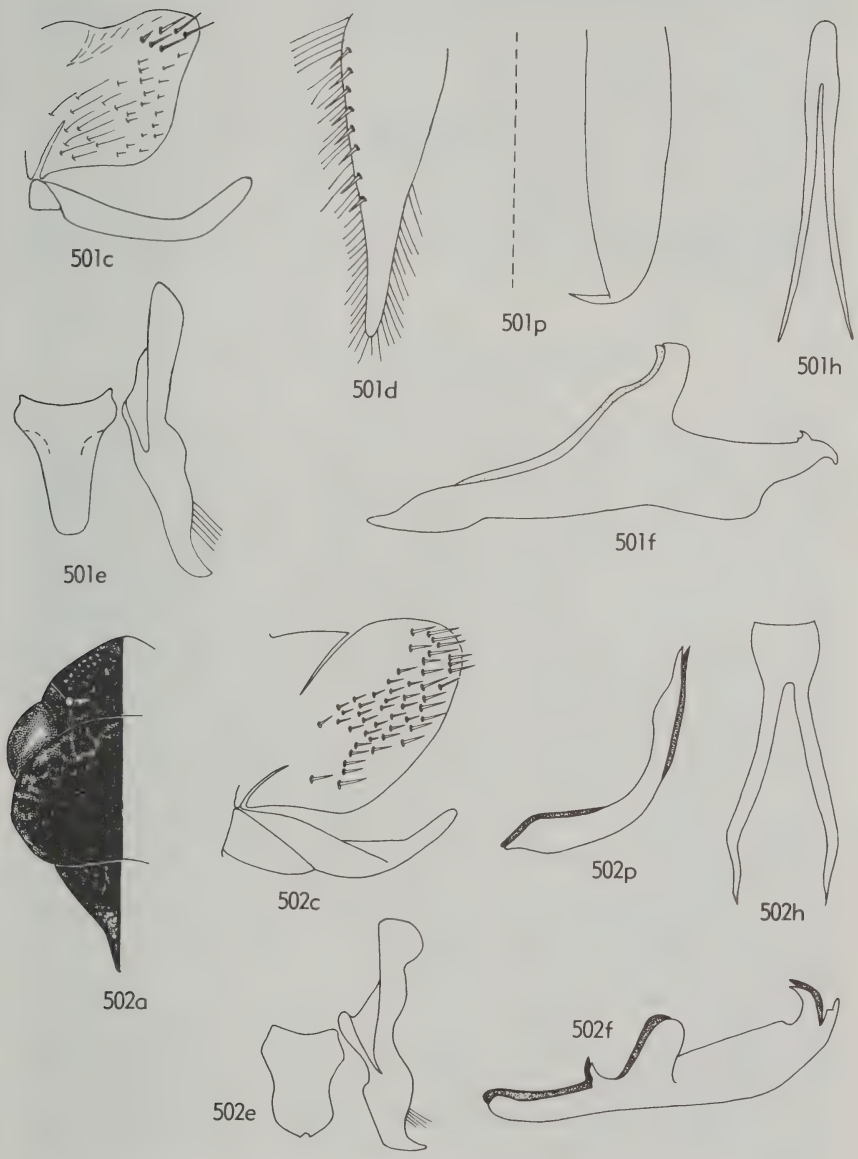
24. Aedeagus with anteapical processes (Brazil) 25
Aedeagus without processes (Central America)
congruens (Fowler) (fig. 523)

25. Smaller, length 5.2 mm; paraphyses with rami much longer than unpaired basal portion ..... *repetita*, n. sp., page 640
Larger, length 6.8-7.2 mm; paraphyses with rami much shorter than unpaired basal portion ..... *osborni*, n. sp., page 627

Oragua jurua, NEW SPECIES

FIGURE 501, PAGE 619

Length of male 9.5 mm. Head with median length of crown approximately four-tenths interocular width and from one-fourth to three-tenths transocular width; ocelli located on a line between anterior eye angles, surface of crown not sculptured; antennal ledges with anterior margins convex; transclypeal suture entire. Pronotum without sculpturing (scutellar surface obscured by pins); forewing with membrane including all of apical cells, apical portions of anteapical cells, and adjacent portion of costal region, abruptly delimited basally, base of fourth apical cell located more proximally than base of third, wing surface without sculpturing; length of first posterior tarsomere greater than combined length of two more distal tarsomeres. Male pygofer with posterior margin concave, with macrosetae few and located near posterodorsal margin, with numerous dispersed microsetae, apex curved mesad and acute in ventral view; plates extending posteriorly beyond pygofer apex, each with uniseriate macrosetae and very numerous microsetae; style extending posteriorly beyond apex of connective, without preapical lobe, apex subangular; aedeagus with preatrium long, truncate apically in lateral view, and with two small angulations on anterior apical angle on each side, in ventral view with apex sagittate with rounded apex; paraphyses with basal portion very short, rami long, slender, tapering, acute apically, the rami not strongly divergent. Female unknown.



FIGURES 501, 502.—501, *Oragua jurua,* n. sp., holotype (*h* from ventral view): *p,* Male pygofer, right side, from ventral view. 502, *O. yuracensis,* n. sp., holotype (*h* from dorsal view): *p,* Paraphyses from lateral view.

Crown, pronotum, and scutellum brown, with minute irregular yellow spots; forewing brown suffused with red and with red veins, with irregularly arranged small white spots from base to claval apex and bases of anteapical cells except at periphery of a larger pale spot in corium opposite midlength of clavus; anteapical cells red basally, each with an irregular pale area near midlength; face, thoracic pleura, and legs tan to sordid yellow, unmarked.

Holotype and two additional males, Fontebôa, Amazonas, Brazil (RMS).

O. jurua, n. sp., is similar in the form of the aedeagus, style, and connective to *O. galerula,* n. sp. The paraphyses are also very short stalked as in *galerula.* It differs from *galerua* in its lack of sculpturing and lack of large orange spots on crown and pronotum, in details of the aedeagal structure, and in the form of the pygofer.

Oragua yuracensis, NEW SPECIES

FIGURE 502, PAGE 619

Length of male 8.9 mm. Head with median length of crown slightly less than one-half interocular width and approximately one-third transocular width; ocelli located on a line between anterior eye angles; surface finely punctate; antennal ledges with anterior margins slightly concave; transclypeal suture obsolete medially. Pronotum without sculpturing; scutellum without sculpturing; forewing with membrane including only inner apical cell, abruptly delimited from remainder of wing surface, base of fourth apical cell located more proximally than base of third, wing surface not punctate before membrane; first posterior tarsomere with length slightly greater than combined length of two more distal tarsomeres. Male pygofer with macrosetae limited to apical one-half; plates extending posteriorly beyond apex of pygofer, each with uniseriate macrosetae; style extending posteriorly slightly farther than apex of connective, with preapical lobe, apex foot-shaped; aedeagus with a pair of inconspicuous apodemes located more basally than the larger conspicuous dorsal apodemes, shaft straight, broad, with ventral margin convex, a narrow short apical portion curved dorsally, with a pair of cultrate anteapical dorsal processes; paraphyses consisting of a very short unpaired basal portion and slender rami that are curved gently dorsally and narrowed anteapically. Female unknown.

Crown, pronotum, scutellum, except apical half, and clavus of each forewing fuscous, thickly marked with dull yellow spots and vermiculations, pale spots clustered and concurrent in apical half of scutellum, corium with darker areas tending to delimit two paler areas, one opposite midclavus and one in bases of anteapical cells; face black with large round dull yellow spots on disk of clypeus and smaller spots on muscle impressions; venter, pleura, and legs fuscous.

Holotype male, 24 miles east of Yurac, Huánuco Province, Peru, October 4, 1954 (E. I. Schlinger and E. S. Ross) (CAS).

O. yuracensis, n. sp., is similar in appearance and size to *O. stylata* (Signoret), from which it differs markedly in the form of the paraphyses, which are forcipate in *stylata* and of the aedeagus which is curved basally in *stylata,* apically

in *yuracensis,* n. sp. The finely punctate surface of the crown is intermediate between the granulate coronal surface in *stylata* and the coarsely punctate condition in the other species of the genus.

Oragua hualla, NEW SPECIES

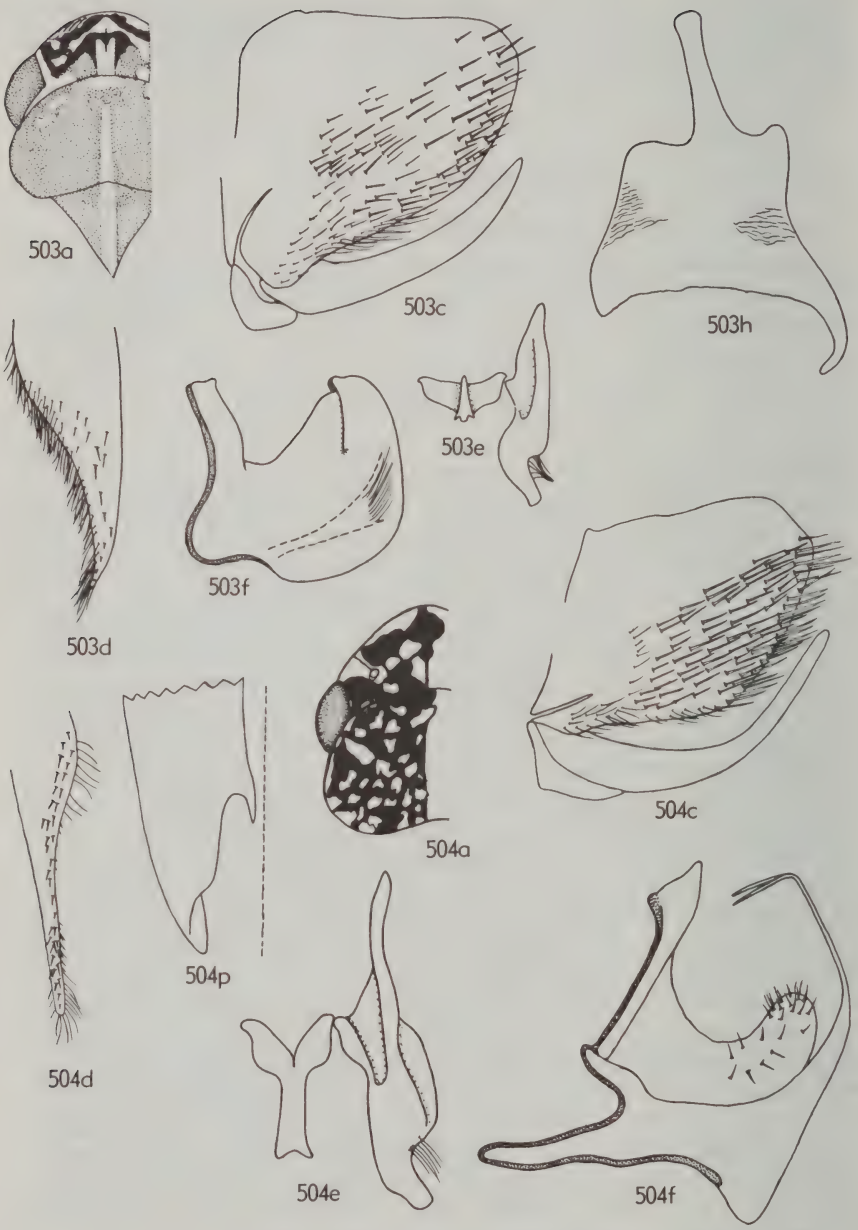
FIGURE 503, PAGE 622

Length of male 6.6-8.3 mm, of female 8.3 mm. Head with median length of crown varying from less than one-half to slightly less than six-tenths interocular width and from slightly less than three-tenths to slightly more than one-third transocular width; ocelli located on a line between anterior eye angles, surface of crown not, or only obscurely sculptured, surface elevated near middle of posterior margin; antennal ledges with anterior margins slightly concave; transclypeal suture obsolete medially. Pronotum and scutellum without sculpturing; forewing without a membrane, base of fourth apical cell located more proximally than base of third, wing surface without sculpturing, middle anteapical cell with at least one supernumerary cross vein; first posterior tarsomere with length approximately equal to combined length of two more distal tarsomeres. Male pygofer thickly beset with setae on posterior two-thirds and basiventrally, the dorsoapical setae stouter than the others; plates extending posteriorly almost as far as pygofer apex, with numerous fine setae; style extending posteriorly much beyond apex of connective, with preapical lobe, apex narrow and subtruncate; aedeagus short and very broad in lateral view, with a pair of short dorsoapical processes; paraphyses asymmetrical, with a short stalk leading to a broad platelike portion which may bear a ramus laterally. Female abdominal sternum VII with posterior margin slightly oblique on each side of truncate median portion.

Crown brown with a somewhat anchor-shaped ivory median marking that is edged in black before and behind its transverse portion and with additional ivory markings bordering inner eye margins and on posterior margin behind eyes; pronotum tan with three ivory to orange spots bordering anterior margin and a median ivory stripe on posterior three-fourths and extending to apex of scutellum; scutellum with a pair of black spots flanking the median line at base, remainder tan (the median line of the scutellum is orange in one specimen); forewings translucent tan, each with a dull ivory longitudinal line beginning in base of clavus laterad of lateral angle of scutellum, interrupted by claval suture and continued in brachial cell to its apex; face, thoracic pleura, and legs paler tan, the muscle impressions of the clypeus darker.

Holotype and three additional males and three females, Huánuco, Peru, January 27, 1947, 6500 ft. (AMNH). One male, Arequipa, Peru, August 21 (Cockerell) (CAS).

O. hualla, n. sp., may be distinguished from other species in the genus by the form of the aedeagal shaft, by the elevated posterior portion of the crown, and by the color pattern.



FIGURES 503, 504.—503, *Oragua hualla*, n. sp. (*a* from specimen from Huánuco, Peru; remainder from Arequipa, Peru; *h* from ventral view). 504, *O. maculifera*, n. sp., holotype (basal portion of anal tube shown in *f*): *p*, Male pygofer apex, right side, from caudoventral view.

Oragua maculifera, NEW SPECIES

FIGURE 504, PAGE 622

Length of male 9.6 mm, of female 10.0 mm. Head with median length of crown approximately one-half interocular width and slightly more than one-third transocular width; ocelli located on a line between anterior eye angles, surface of crown densely punctate, antennal ledges with anterior margins oblique and slightly concave; transclypeal suture obsolete medially. Pronotum transversely rugose and punctate; forewing with only inner apical cell membranous, base of fourth apical cell located more proximally than base of third, wing surface densely punctate except apical cells and apical portions of anteapical cells; first posterior tarsomere with length approximately equal to combined length of two more distal tarsomeres. Male pygofer with numerous macrosetae of uniform size on lower portion of apical two-thirds and with a few microsetae near base of the group of macrosetae; plates extending posteriorly as far as pygofer apex, each with multiseriate small setae; style extending posteriorly beyond apex of connective, with preapical lobe, apex rounded; aedeagus with shaft slender, attenuate, with a pair of slender, acute, procurved, apical processes; paraphyses absent. Female abdominal sternum VII with posterior margin transverse on each side of a short median acute posterior projection.

Crown, pronotum, and forewings brown with pale irregular spots and vermiculations some of which are suffused with orange; scutellum brown with a pair of basal pale spots; face brown mottled with paler spots on clypeus of male, median area of clypeus broadly pale in female, remainder of face, thoracic pleura, femora, brown mottled with poorly delimited paler spots, posterior tibiae brown.

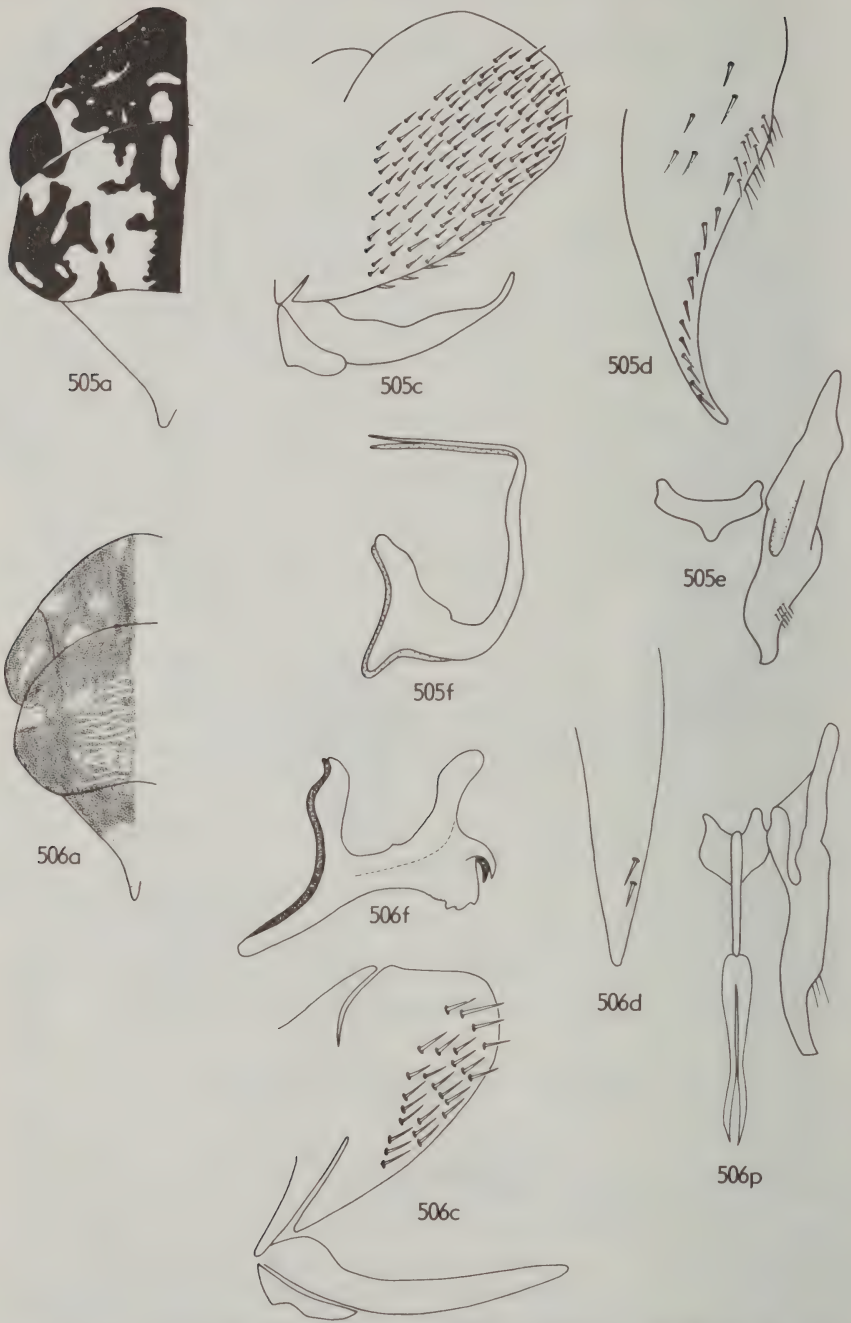
Holotype male "Corupa", Santa Catharina, Brazil, February, 1936 (AMNH). One female, Santa Catharina (RMS).

O. maculifera, n. sp., is close to *O. maculipes* (Signoret) (fig. 505) of which I have seen only the lectotype, which was not at hand for comparison at the time the above description was written. The longer plates and connective and the shorter apical aedeagal processes in comparison to the aedeagal shaft of *maculifera* seem sufficiently distinct to warrant the present description.

Oragua pucallpensis, NEW SPECIES

FIGURE 506, PAGE 624

Length of male 7.1 mm. Head with median length of crown slightly less than six-tenths interocular width and slightly more than one-third transocular width; ocelli located slightly before a line between anterior eye angles, surface coarsely punctate; antennal ledges with anterior margins slightly concave; transclypeal suture obsolete medially. Pronotum coarsely punctate and transversely rugose; scutellum coarsely punctate in basal half, transversely rugose in apical half; forewing with membrane including apical portion of anteapical cells and all of apical cells, not sharply delimited at base, fourth



FIGURES 505, 506,—505, *Oragua maculipes* (Signoret), lectotype. 506, *O. pucallpensis*, n. sp., holotype: *p*, Style, connective, and paraphyses, from dorsal view.

apical cell located more proximally than base of third, wing surface punctate before membrane. Male pygofer with macrosetae limited to apical one-half; plates extending posteriorly beyond apex of pygofer, each with only a few macrosetae near apex; style extending posteriorly beyond apex of connective, with preapical lobe, apex truncate; aedeagus with a pair of conspicuous dorsal apodemes, shaft with dorsal margin curved regularly dorsally, rounded apically, ventral margin with a keel-like process at midlength and with a pair of decurved processes at its apex; paraphyses symmetrical, consisting of a very short unpaired basal portion and a pair of elongate, slender, tapering, acute rami which are narrowly separated throughout their length and with their apices approximate. Female unknown.

Crown, pronotum, and scutellum fuscous; crown with a marking on each side of apex, and four circular spots in an arcuate row across ocelli, orange, a pair of flesh-colored spots on posterior margin; pronotum with a few small spots on or near midline on basal half, a transverse row of four flesh-colored larger spots at midlength, and a few very small orange spots in a transverse group near middle of hind margin; scutellum with a large yellowish-orange anteapical spot; forewing with a pair of orange spots surrounded by a broad black border in basal angle, and two fused yellow spots surrounded by a similar broad black border near midlength of corium, remainder coriaceous black, sprinkled with round yellow dots as far as beginning of membrane; clypeus fuscous with small yellow spots between muscle impressions and larger irregular spots on disk, with a pair of orange spots bordering transclypeal suture, antennal ledges orange, genae and thoracic pleura yellow and black.

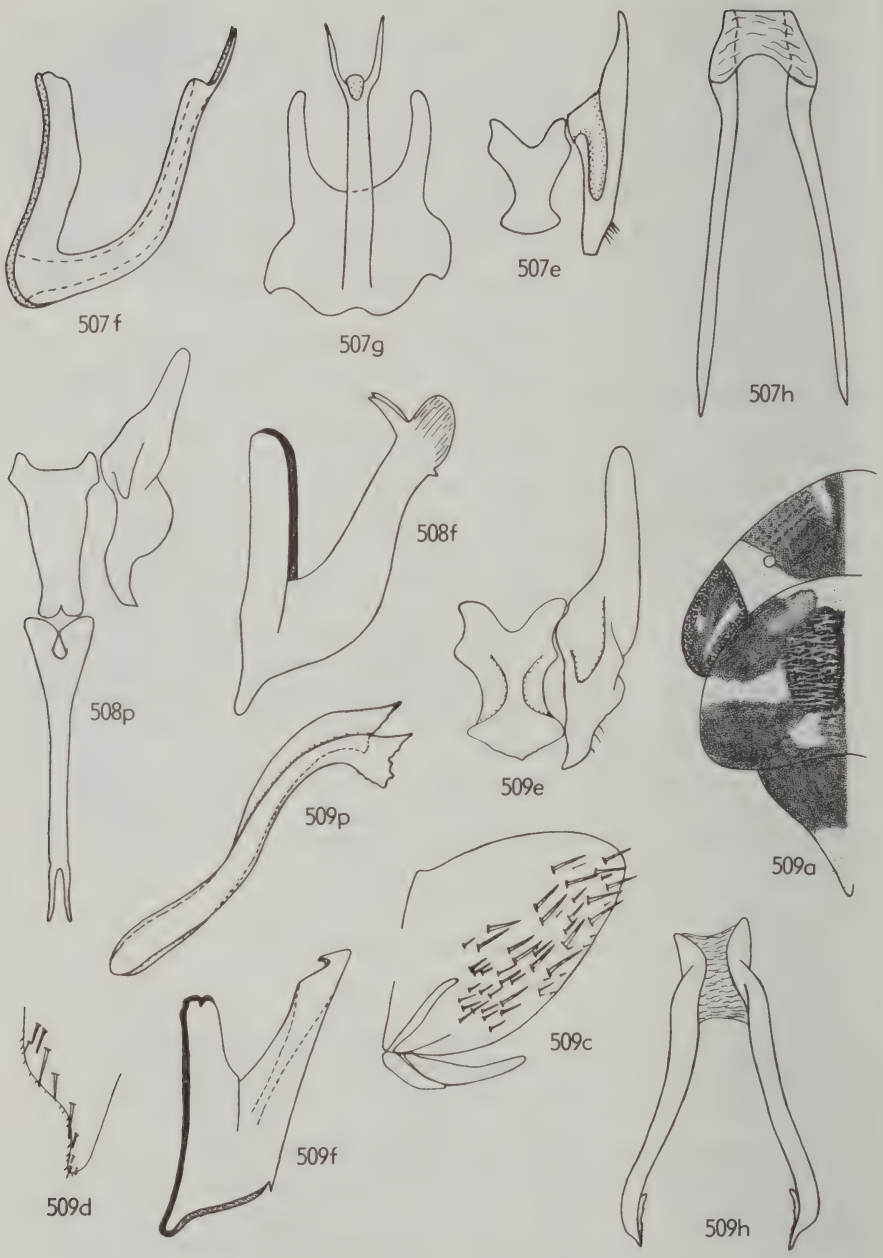
Holotype male, Pucallpa, Yarinococha, Loreto Province, Peru, July 28, 1962 (V. T. Van Velzen) (USNM).

The markings of *O. pucallpensis,* n. sp., are more nearly like those of *O. osborni,* n. sp., than to any other species in the genus, but the spots on the crown are larger in *pucallpensis*. The male genitalia of *pucallpensis* are distinctive.

Oragua galerula, NEW SPECIES

FIGURE 509, PAGE 626

Length of male 8.4-9.1 mm, of female 8.4 mm. Head with median length of crown slightly more than four-tenths interocular width and slightly less than three-tenths transocular width; ocelli located on a line between anterior eye angles, surface coarsely punctate; antennal ledges with anterior margins slightly concave; transclypeal suture obsolete medially. Pronotum coarsely punctate and in some specimens transversely rugose; scutellum coarsely punctate; forewing with membrane including all of apical cells, not abruptly delimited from coriaceous portion, base of fourth apical cell located more proximally than base of third, wing surface coarsely punctate before membrane. Male pygofer with macrosetae of varying sizes occurring on posterior two-thirds; plates short for genus, not extending nearly as far posteriorly as pygofer apex, each with uniseriate macrosetae; style extending posteriorly approximately as far as apex of connective, with preapical lobe, apex acute;



FIGURES 507-509.—507, *Oragua variolosa* (Signoret), lectotype (*h* from dorsal view). 508, *O. osborni*, n. sp., holotype: *p*, Style, connective, and paraphyses, from dorsal view. 509, *O. galerula*, n. sp., holotype (*h* from dorsal view): *p*, Paraphyses from lateral view.

aedeagus with shaft straight, extending posterodorsally, with a pair of very short acute apical processes directed anterodorsally (at right angle to axis of shaft); paraphyses with rami separate almost to base, in lateral view bisinuous, expanded apically and truncate with apical margin erose. Female abdominal sternum VII similar to that of *O. stylata* (Signoret) (fig. 500*i*).

Crown, pronotum, and scutellum fuscous, crown with a longitudinal mark on each side of apex and a broad band bordering inner margin of eye and including all of antennal ledge on each side, orange; pronotum with a median basal spot, a transverse spot on each side at midlength, and a pair of small spots near median line just before posterior margin, orange; scutellum orange behind transverse sulcus; forewing black with yellow or orange spot in base of clavus, a yellow spot at middle of corium, and one or a pair of yellow spots in anteapical cells, each of the preceding broadly surrounded with black, remainder as far as base of anteapical cells with numerous smaller yellow spots; clypeus black except a median V-shaped orange marking, remainder of face and proepimeron orange, mesepimeron marked with yellow, remainder of thoracic pleura and abdominal venter black, legs ferruginous to fuscous.

Holotype male, French Guiana (Le Moult), and one female bearing the additional information "St. Jean du Maroni" (NCS). One specimen without abdomen, Surinam (ZIMH). Three males, Territory Amapá Serro Navio, Brazil: one October 13, 1957 (J. Lane); one September 22, 1957 (J. Lane); and one August, 1959 (Bicelli) (J. Lane collection).

O. galerula, n. sp., is similar to *O. yuracensis,* n. sp., in the structure of the male genitalia, but the shorter male plates and the bisinuate paraphyses in lateral view are not like *yuracensis,* which also lacks the orange markings of *galerula.*

Oragua osborni, NEW SPECIES

FIGURE 508, PAGE 626

Length of male 6.8-7.2 mm. Head with median length of crown varying from slightly more than one-half to slightly less than one-half interocular width and from three-tenths to approximately one-third transocular width; ocelli located slightly before a line between anterior eye angles, surface coarsely punctate; antennal ledges with anterior margins slightly concave; transclypeal suture entire or obsolete medially. Pronotum coarsely punctate and transversely rugose; scutellum punctate except for a narrow transversely rugose area at transverse sulcus; forewing with membrane including all of apical cells, abruptly delimited from remainder of wing surface, base of fourth apical cell located more proximally than base of third, wing surface punctate from base usually as far posteriorly as bases of apical cells. Male pygofer and plates as in *O. galerula,* n. sp. (fig. 509); style extending posteriorly as far as apex of connective, with prominent lobe at midlength of shank, apex truncate; aedeagus with dorsal apodemes simple, without additional apodemes at or near base, shaft curved posterodorsally, with a minute ventral anteapical angular projection and a pair of dorsal anteapical processes; paraphyses consisting of a very long unpaired basal piece and a pair of short apical rami. Female unknown.

Crown and pronotum fuscous with small irregular yellow spots; scutellum with basal portion fuscous, usually with a median pale stripe, apical portion pale; forewing fuscous, with small yellow spots to middle of anteapical cells except a larger round yellow spot at base of wing and a similar one near middle of corium, both broadly black-bordered; face and thoracic pleura brown with small pale markings.

Holotype and seven additional males, "Taperina", Brazil; one male, "Santarem", Brazil (CM). One male, "Santarem", Brazil (C. F. Baker collection) and one male, near Alemquer, Pará, Brazil (C. F. Baker collection) (USNM). I have been unable to locate "Taperina". Presumably the "Santarem" is in Pará.

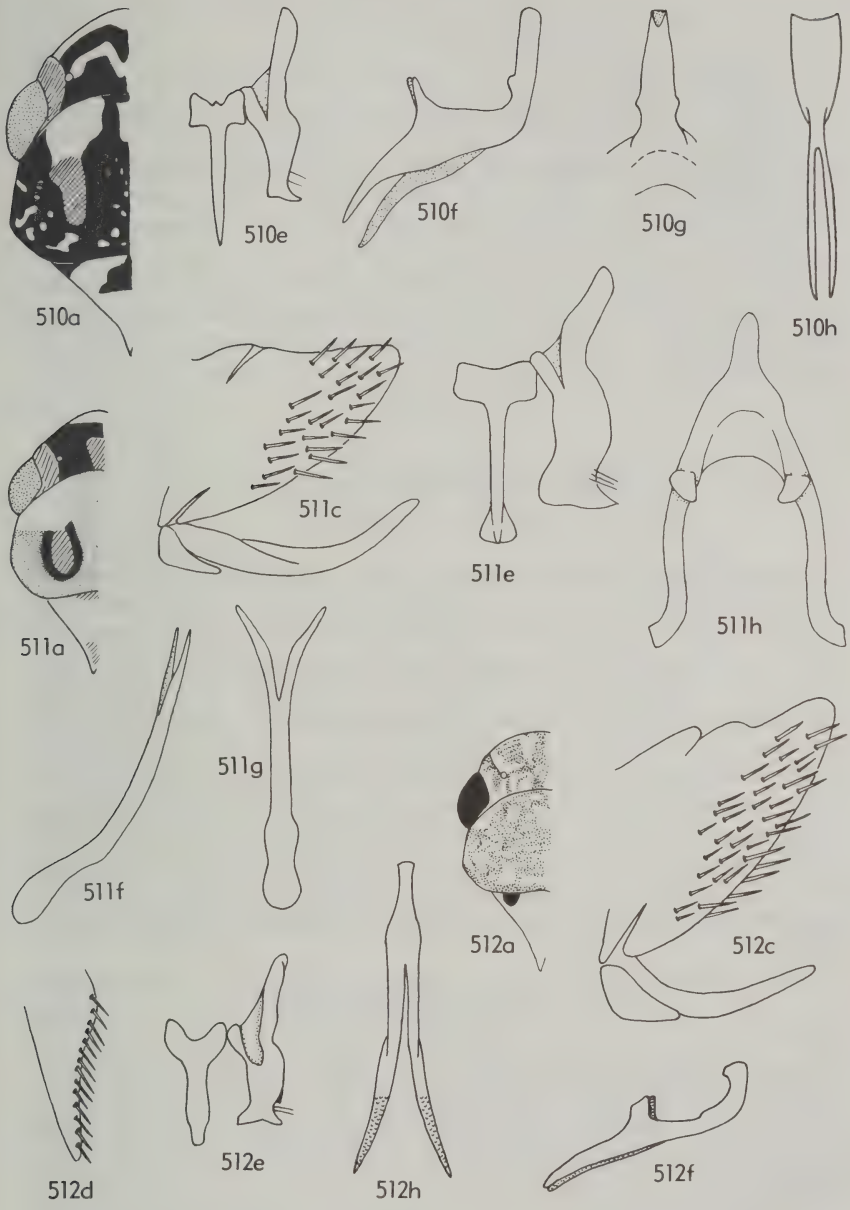
O. osborni, n. sp., is probably closer to *O. galerula* than to other species of the genus. It differs from all other species in the shape of the paraphyses. I take pleasure in naming this species in honor of Dr. Herbert Osborn who did much work on neotropical leafhoppers. This is the species he identified as *nebulosa* (Signoret), but it doesn't agree very well with the original description nor with my notes on the lectotype. It is not the same species Melichar identifed as *nebulosa* (Signoret) in MMB.

Oragua alvarengai, NEW SPECIES

FIGURE 510, PAGE 629

Length of male approximately 7.5 mm, of female 8.5 mm. Head with median length of crown varying from slightly less than one-half to slightly greater than one-half interocular width, and from three-tenths to one-third transocular width; ocelli located on a line between anterior eye angles, surface of crown densely punctate; antennal ledges with anterior margins concave; transclypeal suture obsolete medially. Pronotum without sculpturing; scutellum with sculpturing weak or absent on its posterior portion; forewing with all of apical cells membranous, but base of membranous portion not sharply delimited, base of fourth apical cell located more proximally than base of third, wing surface not punctate before membrane. Male pygofer with macrosetae on apical two-thirds; plates extending posteriorly almost as far as pygofer apex, each with uniseriate macrosetae; style not extending posteriorly nearly as far as apex of connective, without preapical lobe, apex foot-shaped; aedeagus with very short dorsal apodemes, aedeagus in lateral view with shaft curved dorsally at midlength, its apical half almost at a right angle to its basal half, with a short angularity on each side at base of apical half; paraphyses with stalk approximately equal in length to slender tapered subparallel rami. Female abdominal sternum VII with a posterolateral angle on each side and with a narrow acute median projection from posterior margin.

Crown and pronotum brown, crown with a broad orange marking bordering inner margin of each eye, middle of disk with a yellow marking in form of a "V" but with anterior end of each arm curved posterolaterally; pronotum with a large marginal tan spot on each side of anterior margin and a longitudinal orange marking extending posteriorly from it towards posterior pronotal margin, with a number of small yellow spots on brown background of



FIGURES 510-512.—510, *Oragua alvarengai,* n. sp., holotype (only aedeagal shaft shown in *g; h* from caudal view). 511, *O. elegantula,* n. sp. (*a* from topotype; remainder from holotype; *h* from dorsal view). 512, *O. bousemani,* n. sp., holotype (*h* from caudoventral view).

remainder; scutellum brown with a pair of large basal spots and most of apical half yellow; forewing brown with three slender spots in clavus and three large spots in corium, one on disk near midlength, one bordering costal margin opposite claval apex, and the third extending diagonally from near claval apex to near base of outer apical cell, orange, and with smaller yellowish-orange spots in both clavus and corium; face dull yellow with weak brown longitudinal shading over muscle impressions of clypeus, thoracic pleura and legs dull yellow except dark apical half of each posterior tibia.

Holotype and one additional male and one female, Jacareacanga, Pará, Brazil, October, 1959 (M. Alvarenga) (OSU).

O. alvarengai, n. sp., is similar in appearance to *O. elegantula*, n. sp., but differs from the latter in its more nearly angulate head in dorsal view, in lacking a large median coronal orange spot, and in the more strongly curved aedeagal shaft of the male.

Oragua elegantula, NEW SPECIES

FIGURE 511, PAGE 629

Length of male 7.2 mm, of female 8.4 mm. Head with median length of crown varying from slightly more than four-tenths to one-half interocular width and approximately one-fourth transocular width, other characters of head and pronotum as in *Oragua alvarengai*, n. sp.; scutellum transversely rugulose on posterior portion; forewings as in *alvarengai*. Male pygofer with macrosetae on posterior half and the group extending basiventrally to basal half of pygofer; plates extending posteriorly as far as pygofer apex, each with uniseriate macrosetae; style not extending posteriorly as far as apex of connective, without preapical lobe, apex very broadly foot-shaped; aedeagus without dorsal apodemes, shaft almost horizontal in lateral view, with a pair of apical divergent tapering processes; paraphyses very short-stalked, rami more strongly divergent than in other species in the genus, each ramus with a short dorsal process near its base. Female abdominal sternum VII as in *alvarengai*.

Crown black with a broad band bordering each eye and a cuneate median spot, orange, apex yellow to orange; pronotum marked as in *alvarengai;* scutellum dark brown with a median basal and an anteapical orange spot; forewing brown with basal, middle, and anteapical elongate spots in clavus, three oval spots in corium and a transverse vitta across anteapical cells at their midlength, orange, a short elongate spot near midlength of costal margin and a spot near apex of brachial cell, dull yellow; face, pleura, and legs as in *alvarengai*.

Holotype and one additional male, Fontebõa, Amazonas, Brazil (RMS).

O. elegantula, n. sp., is closely related to *O. alvarengai*, in the discussion of which diagnostic characters are given.

Oragua bousemani, NEW SPECIES

FIGURE 512, PAGE 629

Length of male 8.0 mm, of female 8.7 mm. Head with median length of crown slightly more than four-tenths interocular width, and from one-fourth to slightly less than three-tenths transocular width; ocelli located on a line between anterior eye angles, surface of crown coarsely punctate; antennal ledges with anterior margins concave; transclypeal suture obsolete medially. Pronotum, scutellum, and portion of forewing basal to apical cells, punctate; apical cells membranous with base of membrane abruptly delimited, base of fourth apical cell located more proximally than base of third. Male pygofer with macrosetae on apical two-thirds; plates not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly almost as far as apex of connective, apex broad, truncate, and slightly concave, with preapical lobe weak; aedeagus with very short dorsal apodemes, shaft in lateral view curved dorsally through 90° near its apex; paraphyses with stalk much shorter than rami which are slender, tapering, gradually divergent and minutely sculptured in their apical one-third. Female abdominal sternum VII with posterior margin tapered to acute apex, without posterolateral lobes.

Crown and pronotum dull yellow, heavily and irregularly marked with black, scutellum with a basal black spot on each side; forewing with coriaceous portion marked as on anterior dorsum, but with a larger dull yellow spot in inner anteapical cell; face with ground color as on anterior dorsum, with muscle impressions on clypeus and median additional irregular markings on clypeus and clypellus black; thoracic pleura, venter, and legs dull yellow to dull ivory.

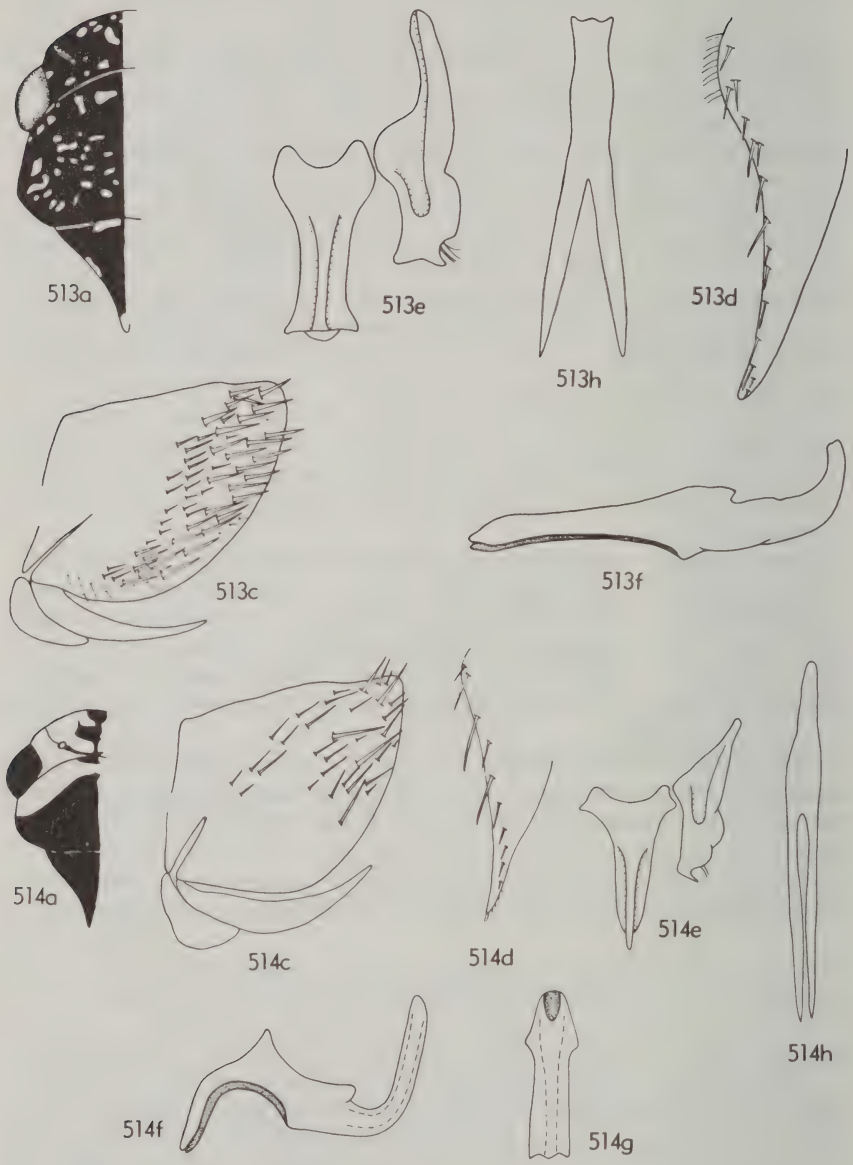
Holotype male, mouth of Río Ibare, Río Mamore, Dept. Beni, Bolivia, August 18, 1965 (J. K. Bouseman), and one female, Saavedra Experiment Station, Dept. Santa Cruz, Bolivia, December 28, 1959 (R. Cumming) (OSU).

O. bousemani, n. sp., is similar to *O. alvarengai,* n. sp., in many respects, but has no orange markings. The aedeagus is distinctive within the genus.

Oragua nusinasa, NEW SPECIES

FIGURE 513, PAGE 632

Length of male 10.1-10.3 mm, of female 10.7 mm. Head with median length of crown varying from slightly more than one-third to more than four-tenths interocular width and from one-fifth to more than one-fourth transocular width; ocelli located on a line between anterior eye angles, surface of crown densely punctate; antennal ledges with anterior margins convex; transclypeal suture obsolete medially. Pronotum and scutellum densely punctate; forewing with membrane including almost all of apical cells, not sharply delimited from remainder of wing, base of fourth apical cell located more proximally than base of third, wing surface punctate before apical cells. Male pygofer with macrosetae of several sizes and with interspersed microsetae all



FIGURES 513, 514.—513, *Oragua nusinasa*, n. sp., holotype (*h* from dorsal view). 514, *O. insipida*, n. sp., holotype (only aedeagal apex shown in *g*; *h* from dorsal view).

located on posterior half; plates not extending as far posteriorly as pygofer apex, each with uniseriate (mostly) macrosetae; style not extending posteriorly nearly as far as apex of connective, broad and concavely truncate apically; aedeagus with shaft cylindrical, curved dorsally at apex, without processes; paraphyses long-stalked, the rami tapering and acute, not strongly divergent. Female abdominal sternum VII well produced posteriorly, gradually tapered and acute apically. Anterior dorsum and forewing, except apical cells, black with small pale yellowish to ivory spots, larger on scutellum; clypeus and clypellus black, spotted as above, remainder of face, thoracic pleura, and legs brown.

Holotype and one additional male, Santa Isabel, Cuzco Province, Peru, November 24, 1951 (holotype) and January 1, 1952 (Felix L. Wygodzinsky) (NCS). One specimen, damaged by dermestids (MMB). One female, Marcapata, Peru, and one female, Callanga, Peru (HNHM).

Only *O. alvarengai,* n. sp., and *O. bousemani,* n. sp., have male genitalia similar to those of *O. nusinasa* and neither has markings like it. *O. alvarengai* lacks punctures on pronotum and forewings.

Oragua insipida, NEW SPECIES

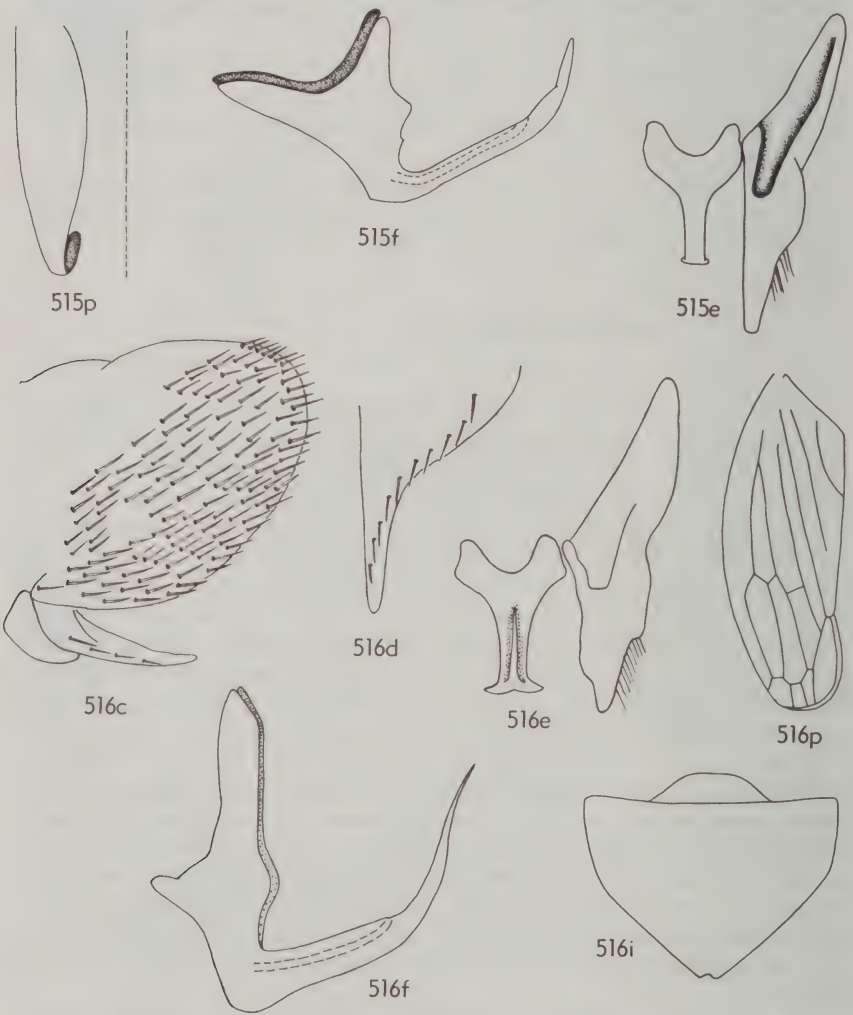
FIGURE 514, PAGE 632

Length of male 7.2 mm, of female 7.6 mm. Head with median length of crown varying from slightly more than one-third to slightly less than one-half interocular width, and from less than one-fifth to approximately one-fourth transocular width; ocelli located on a line between anterior eye angles, surface of crown densely punctate; antennal ledges with anterior margins oblique and rectilinear; transclypeal suture obsolete medially. Pronotum and anterior portion of scutellum coarsely punctate; posterior portion of scutellum transversely rugose, forewing with all of apical cells and an adjoining area bordering costal margin membranous, but with membrane not sharply delimited basally, base of fourth apical cell located more proximally than base of third, wing surface strongly punctate before membrane. Male pygofer with macrosetae on apical two-thirds; plates not extending posteriorly nearly as far as pygofer apex, each with uniseriate macrosetae; style not extending posteriorly nearly as far as apex of connective, with preapical lobe, apex foot-shaped; aedeagus with very short dorsal apodemes, in lateral view with shaft curved dorsally through 90° near its midlength, with a slight expansion on each side near apex in caudal view, without processes; paraphyses with stalk shorter than slender subparallel rami. Female abdominal sternum VII with posterolateral lobes rounded and with a narrow median projection from posterior margin (possibly broken, or abnormal at apex in the single female at hand).

Crown and anterior portion of pronotum brownish-orange, apex of crown, a transverse spot on disk and an arcuate band between ocelli and touching hind margin, black; remainder of pronotum, scutellum and forewings black to dark brown, with a few obscure pale spots on each corium near its base, clypeus

brown with a pair of paler parallel stripes, remainder of face, propleura, and legs dull brown.

Holotype male and one female, Bartica, British Guiana, June 20 (holotype) and April 5 (USNM). One male, Kartabo, Bartica District, British Guiana, 1929 (NCS). One female, Tama Tama, [Taima, Taima?] Amazonas Territory, Orinoco, April 3, 1950, Venezuela Expedition (J. Maldonado Capriles) (USNM). One male, Paramaribo, Surinam, February 13, 1958 (P. H. v. Doesburg) (Leiden Museum). One female, Mazaruni, British Guiana, August



FIGURES 515, 516.—515, *Oragua furva,* n. sp., holotype: *p,* Male pygofer, right side, from ventral view. 516, *O. discoidula* (Osborn) (*c-f* from holotype; remainder from specimen from Piracicaba, São Paulo, Brazil; *i* showing sclerite in dorsal wall of genital chamber): *p,* Forewing.

27, 1937 (Richards and Smart) (BM). One male, Manáos, "Uypairanga", Rio Negro, 81 mi. from Manáos, Amazonas, Brazil, October, 1941 (August Rabaut) (AMNH).

O. insipida, n. sp., is similar to *O. alvarengai,* n. sp., in the structure of the male genitalia, but differs slightly in the form of aedeagus. The species are readily separable externally, *insipida* being shorter and more robust, and by its heavily punctate crown, pronotum, scutellum, and forewings.

Oragua furva, NEW SPECIES

FIGURE 515, PAGE 634

Length of male 5.6 mm. Head with median length of crown slightly less than one-half interocular width and approximately one-third transocular width; ocelli located slightly before a line between anterior eye angles, surface coarsely punctate; antennal ledges with anterior margins slightly concave; transclypeal suture obsolete medially. Pronotum and scutellum coarsely punctate; forewing with membrane including only inner apical cell, abruptly delimited from remainder of surface, base of fourth apical cell located more proximally than base of third, wing surface densely punctate before membrane. Male pygofer with macrosetae occurring over most of surface except basidorsal portion (as in illustration of *O. discoidula* (Osborn) (fig. 516*c*); plates short for genus, not extending nearly as far posteriorly as pygofer, each with multiseriate macrosetae, pygofer process platelike, dorsoapical, extending anteromesally; style extending posteriorly slightly farther than apex of connective, with lobe at midlength, apex bluntly rounded; aedeagus with a pair of very conspicuous apodemes (in addition to dorsal apodemes) extending anterodorsally, shaft very slender, curved slightly dorsally anteapically, acute at apex, without processes. Paraphyses absent.

Anterior dorsum and forewings cinereous (brown or blackish with numerous sordid gray irregularly arranged small spots and areas); face fuscous with large paler irregular areas on clypeus and pale areas between muscle impressions, clypellus, genae, and lora marked with smaller irregular paler spots; thoracic pleura and legs pale brownish irregularly marked with darker.

Holotype male, Tucumán, Ciudad Universitaria, Argentina, 800 m., February 18, 1959 (J. F. G. Clarke) (USNM).

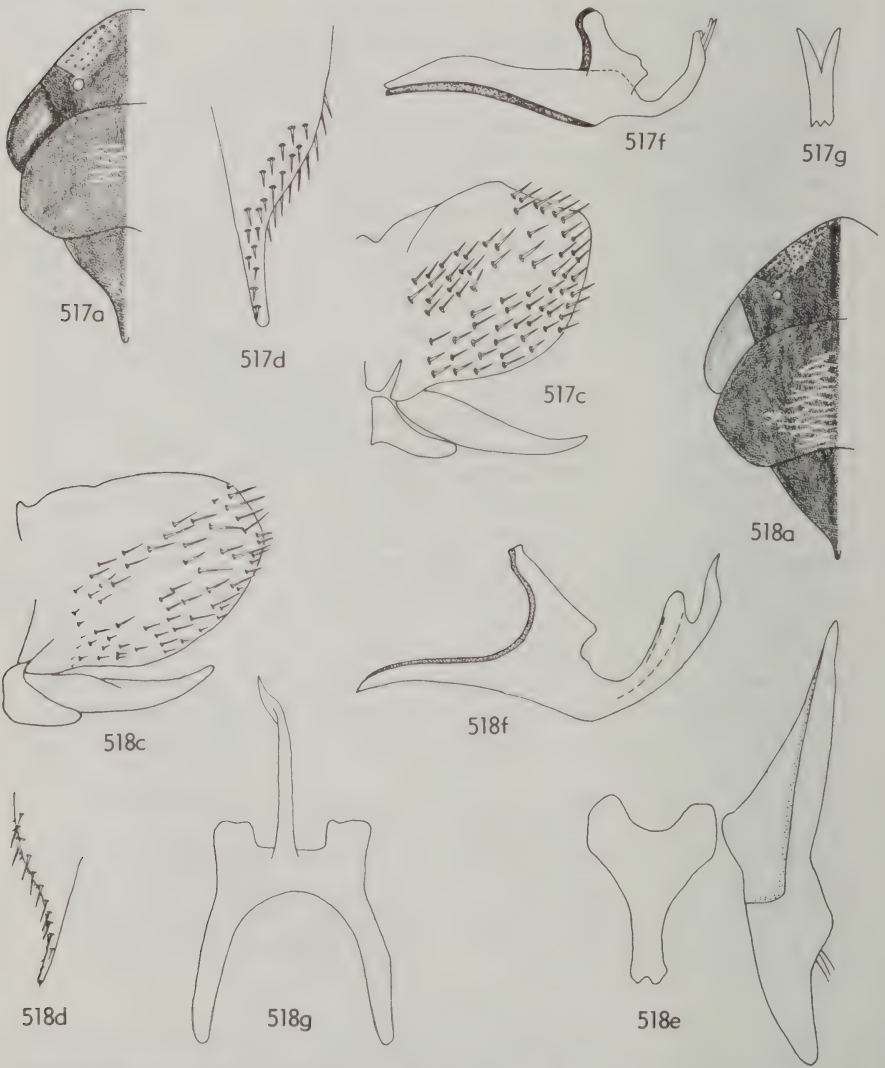
O. furva, n. sp., is similar to *O. discoidula* (Osborn) in the structure of the male genitalia, but is smaller (less than 6.0 mm compared to approximately 7.0 mm or more) and the apical uncurved portion of the aedeagus is not as long as in *discoidula*. Also, the pygofer process is wanting in *discoidula*.

Oragua triplehorni, NEW SPECIES

FIGURE 517, PAGE 636

Length of male 5.6-5.9 mm, of female 6.3-6.4 mm. Head with median length of crown from slightly less than six-tenths to slightly more than six-tenths interocular width, and from slightly more than one-third to more than

four-tenths transocular width; ocelli located slightly before a line between anterior eye angles, surface coarsely punctate; antennal ledges with anterior margins slightly concave; transclypeal suture obsolete medially. Pronotum and anterior portion of scutellum coarsely punctate, scutellum transversely rugose behind transverse sulcus; forewing with membrane including only inner apical cell, abruptly delimited from remainder of wing surface, base of fourth apical cell located more proximally than base of third, wing surface punctate as far



FIGURES 517, 518.—517, *Oragua triplehorni*, n. sp., holotype (only apex of aedeagus shown in *g*). 518, *O. obscura* (Schröder) (from specimens from Mexico).

posteriorly as middle of anteapical cells. Male pygofer with macrosetae occurring irregularly on most of surface except near dorsal margin; plates extending posteriorly beyond apex of pygofer, each with multiseriate macrosetae; style extending posteriorly farther than apex of connective, with prominent lobe near midlength of shank, apex narrowly rounded; aedeagus with pair of very elongate apodemes extending anteriorly, dorsal apodemes short, shaft regularly curved dorsally and with a pair of short anteapical processes. Paraphyses absent. Female abdominal sternum VII with posterior margin transverse, not produced.

Color of dorsum and forewings much as in *O. furva,* n. sp. (above), but with basal angles of scutellum dark and in some specimens with one or a few small pale spots at midlength of corium; face and venter much as in *furva.*

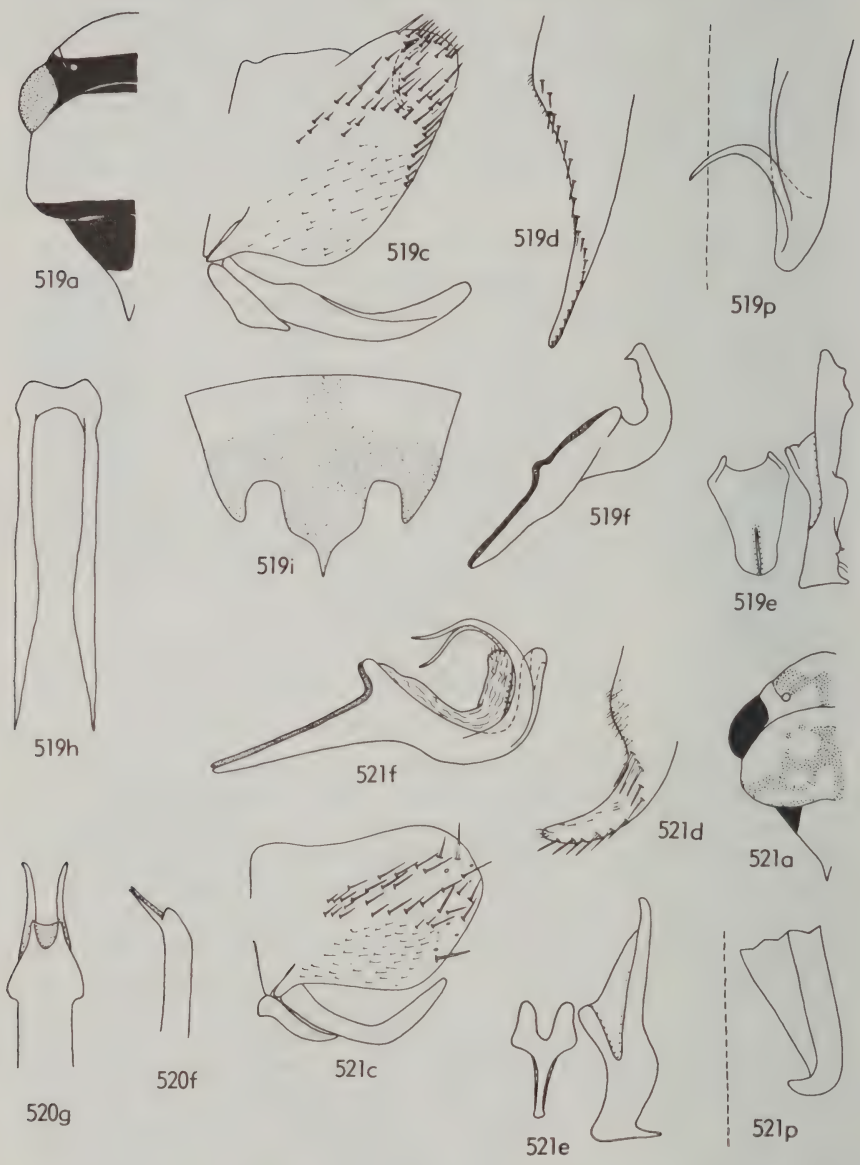
Holotype male, Piracicaba, São Paulo, Brazil, January 22, 1965 (W. E. and C. A. Triplehorn); one male and one female, same data as preceding except date which is December 26, 1964 (OSU). Four males and seven females, Santa Cruz, Bolivia (J. Steinbach) (MCZ).

O. triplehorni, n. sp., is very similar to *O. obscura* (Schröder), but differs in the apex of the aedeagus, and in the multiseriate macrosetae of the male plates. The style and connective of *triplehorni,* not illustrated, are like the illustration of these structures for *obscura.* I am pleased to name this species in honor of Dr. Charles A. Triplehorn who collected the type, and who has been very cooperative during the progress of this work.

Oragua gregoirei, NEW SPECIES

FIGURE 520, PAGE 638

Length of male and female 9.5 mm. Head with median length of crown slightly more than four-tenths interocular width, and approximately one-fourth transocular width; ocelli located on a line between anterior eye angles, surface densely punctate; antennal ledges with anterior margins convex; transclypeal suture obsolete medially. Pronotum punctate and transversely rugulose; scutellum punctate on its posterior portion; forewing with all of apical cells and apical portion of outer two anteapical cells membranous and with membrane extending forward a short distance along costal margin, the membrane sharply delimited from remainder of wing, base of fourth apical cell located more proximally than base of third, wing surface punctate before membrane. Male pygofer with macrosetae dorsally and microsetae more ventrally on apical two-thirds; plates extending posteriorly almost as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly beyond apex of connective, without preapical lobe, apex foot-shaped; aedeagus with a very short dorsal apodeme, shaft curved strongly dorsally near its base, apex slightly broadened in caudoventral view, with a pair of slender dorsoapical processes; paraphyses transverse at base, not stalked, rami slender, tapering, subparallel. Female abdominal sternum VII with a prominent rounded posterolateral lobe on each side and a narrow acute median projection from posterior margin.



FIGURES 519-521.—519, *Oragua partitula* (Jacobi) (*i* from lectotype; remainder from specimen from Beni, Bolivia; *h* from caudoventral view): *p*, Male pygofer apex, right side, from ventral view. 520, *O. gregoirei*, n. sp., holotype (only apex of aedeagus shown). 521, *O. hebeta*, n. sp., holotype: *p*, Male pygofer apex, left side, from ventral view.

Ground color of crown, pronotum, and scutellum orange; with a broad transverse interocular black band across posterior portion of crown and anterior portion of pronotum, a second broader transverse black band including posterior portion of pronotum and all of scutellum except its apex, and bases of forewings; a broad transverse black band extending from costa to costa of wings at rest, across midclavus and a transverse black band behind claval apex, narrowed at costal margins and fading posteriorly to apical membrane; face with a dark area on genae beneath each eye, remainder of face, pleura, venter, and legs, orange.

Holotype male, Limongcha, NE. of Puyo, Ecuador (Dr. C. Gregoire); one female, El Puyo, Ecuador, July, 1964 (same collector); and one specimen without abdomen, road between El Puyo and Puerto Napo, Ecuador, other data as in preceding specimen (USNM).

O. gregoirei, n. sp., is closely related to *O. partitula* (Jacobi), but differs in its smaller size, broader transverse black bands, and its possession of slender dorsoapical aedeagal processes.

The species is named in honor of the collector of the type-series.

Oragua hebeta, NEW SPECIES

FIGURE 521, PAGE 638

Length of male 8.4 mm. Crown, pronotum, anterior portion of scutellum, and forewings except their apical portions densely punctate. Head with median length of crown approximately four-tenths interocular width and one-fourth transocular width; ocelli located on a line between anterior eye angles; antennal ledges with anterior margins oblique and rectilinear; transclypeal suture obsolete medially. Scutellum transversely rugose in its apical portion; forewing with all of apical cells and adjacent portion of anteapical cells membranous, but base of membranous portion not sharply delimited, base of fourth apical cell located more proximally than base of third. Male pygofer with numerous setae on apical two-thirds, macrosetae above, microsetae below; plates extending posteriorly almost as far as pygofer apex, each with uniseriate macrosetae and numerous microsetae; style extending posteriorly beyond apex of connective, without preapical lobe, apex foot-shaped; aedeagus with very short dorsal apodemes, aedeagus in lateral view with shaft curved regularly posterodorsally, with a pair of long tapering processes arising laterally at midlength of shaft, curved gradually dorsally and anteriorly, greatly exceeding aedeagal apex; paraphyses absent. Female unknown.

Crown, pronotum, and scutellum tan, crown with a median diamond-shaped mark connected on each side with the upper extremity of the darkened area of the muscle impressions; pronotum with a large faint orange spot behind each eye, with a few broad vermiculate dark markings on disk; scutellum with basal angles black; forewings dark brown with elongate pale spots and dots arranged in lines parallel to longitudinal veins to claval apex and slightly farther at outer anteapical cell; with a pale round spot on corium opposite midlength of clavus and an oval similar spot in inner anteapical cell on each

wing, with a costal transparent area opposite anteapical cells, clypeus with muscle impressions dark, remainder of face, thoracic pleura, and legs tan.

Holotype male, Chapada, Brazil, August (USNM).

The form of the aedeagal processes, and their origin near the midlength of the shaft are distinctive characters for *O. hebeta,* n. sp.

Oragua schmidti, NEW SPECIES

FIGURE 522, PAGE 641

Length of male 10.7 mm. Head with median length of crown slightly more than one-half interocular width and slightly less than four-tenths transocular width; ocelli located on a line between anterior eye angles; antennal ledges with anterior margins slightly concave; transclypeal suture complete. Pronotum transversely rugose, not punctate; scutellum transversely rugose behind transverse sulcus; forewing with membrane including only inner apical cell, abruptly delimited from remainder of wing surface, base of fourth apical cell located more proximally than base of third, wing surface without sculpturing before membrane. Male pygofer with macrosetae limited to apical one-half, with an apical strongly sclerotized broad process directed mesally; plates extending posteriorly beyond apex of pygofer, with macrosetae uniseriate in apical portion, multiseriate basally; style extending posteriorly much beyond apex of connective, without preapical lobe, apex concave with a slight anteapical angular projection; aedeagus with a pair of short anterior lobes from the longer dorsal apodemes, shaft curved regularly dorsally through 90° with a pair of elongate slender apical processes extending in direction of apical half of shaft; paraphyses slightly asymmetrical, unbranched basal portion almost as long as the slender acute rami. Female unknown.

Crown, pronotum, and scutellum fuscous with obscure indistinct dark orange markings; forewings cinereous with a yellow spot near middle of brachial cell and one bordering claval margin opposite midlength of outer anteapical cell; clypeus and clypellus black with pale arcs in area of muscle impressions and slightly larger spots on clypeus, with a pair of dark red spots at base of clypellus; venter, thoracic pleura and legs brown.

Holotype male, Brazil (MMB).

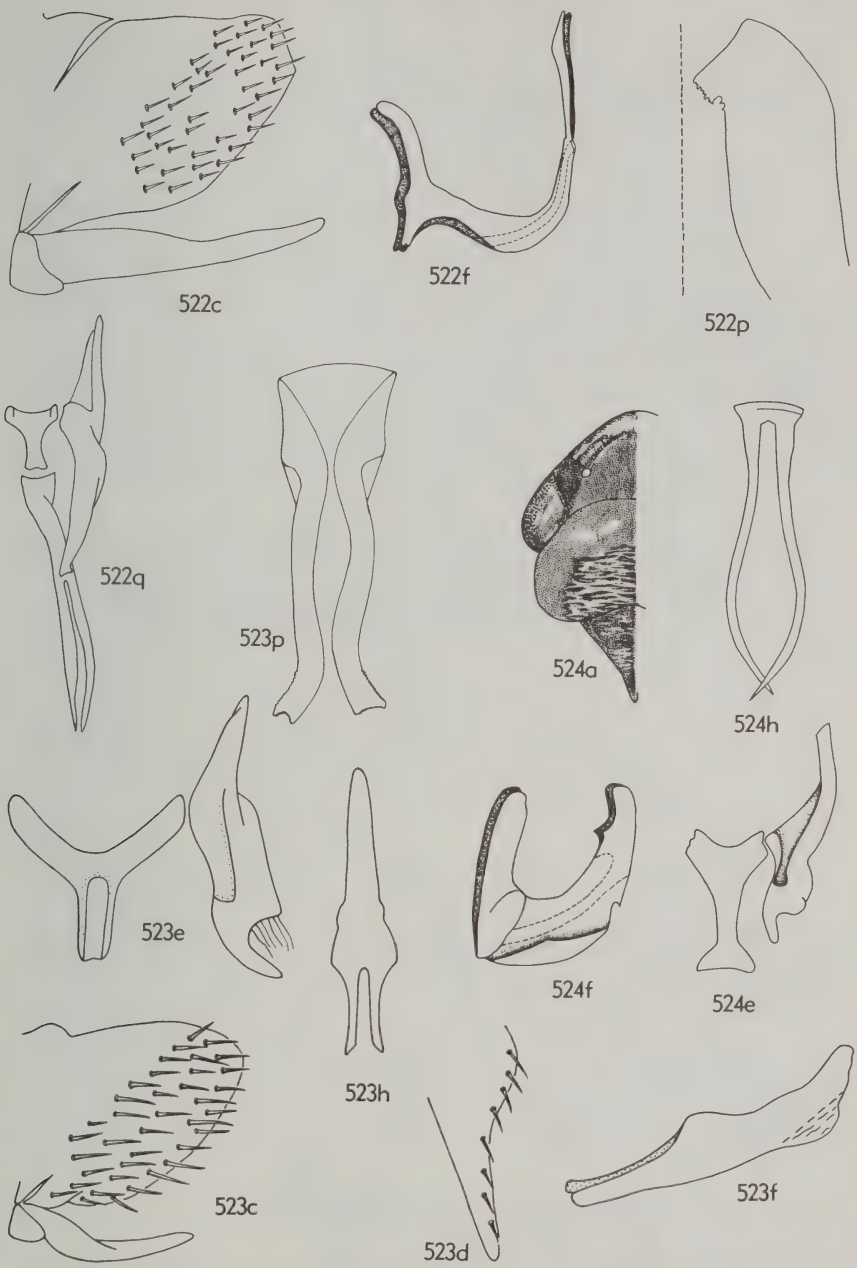
O. schmidti, n. sp., in size and general appearance resembles *O. yuracensis,* n. sp. and *O. stylata* (Signoret). *O. variolosa* (Signoret) has an aedeagus with comparably slender apical aedeagal processes, but these are shorter than in *schmidti. O. furva,* n. sp., has pygofer processes but these are located differently and not sclerotized as they are in *schmidti.*

This species is named in honor of Edmund Schmidt, who studied many Cicadellinae in the first third of this century.

Oragua repetita, NEW SPECIES

FIGURE 524, PAGE 641

Length of male 5.2 mm. Head with median length of crown approximately one-half interocular width and slightly less than one-third transocular width;



FIGURES 522-524.—522, *Oragua schmidti*, n. sp., holotype: *p*, Male pygofer apex, right side, from caudal view; *q*, style, connective, and paraphyses, from dorsal view. 523, *O. congruens* (Fowler) (*p* from specimen from Chiapas, Mexico; remainder from lectotype; *h* from caudoventral view): *p*, Paraphyses from caudoventral view. 524, *O. repetita*, n. sp., holotype.

ocelli located on a line between anterior eye angles, surface coarsely punctate; antennal ledges with anterior margins slightly concave; transclypeal suture obsolete medially. Pronotum coarsely punctate and transversely rugose; scutellum coarsely punctate in basal portion, transversely rugose behind transverse sulcus; forewing with membrane including only inner apical cell, abruptly delimited from remainder of wing surface, base of fourth apical cell located more proximally than base of third, wing surface coarsely punctate from base almost to apex of anteapical cells. Male pygofer with macrosetae occurring on posterior half; plates not extending posteriorly nearly as far as pygofer apex, each with multiseriate macrosetae; style not extending posteriorly as far as apex of connective, with conspicuous preapical lobe, apex narrowly rounded; aedeagus with a small lobe on each side at base of dorsal apodeme, shaft short, broad, curved gradually dorsally, with a pair of flattened appressed processes at apex each of which bears an anterobasal angulation and a rounded apex; with a short ventral angular projection on each side near base of shaft; paraphyses branched at base, with rami slender and acute. Female unknown.

Crown, pronotum, scutellum, and forewings fuscous with sparse irregular ivory markings, forewing with a larger ivory spot in basal half of corium and a sinuous transverse ivory band extending from costal margin almost to claval apex; face and thoracic pleura black with numerous yellow markings; legs brown.

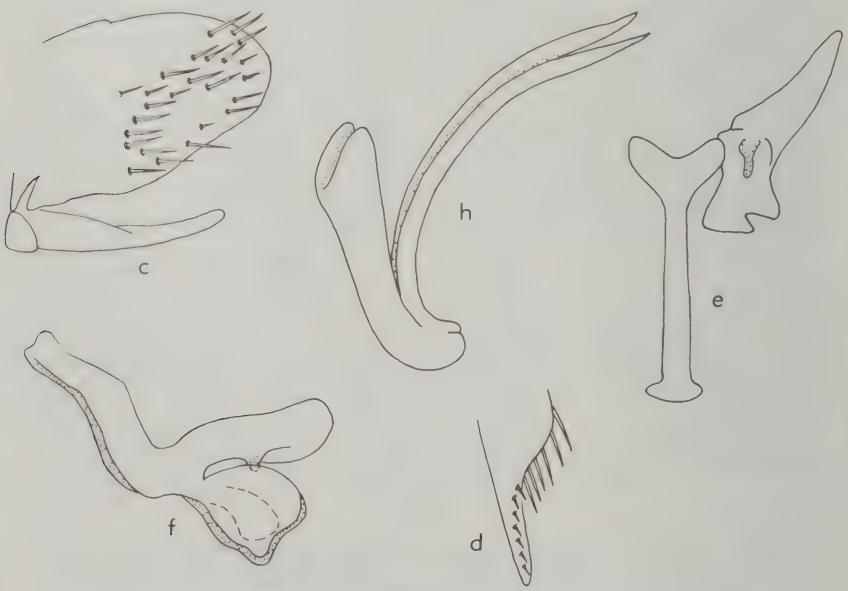


FIGURE 525.—*Oragua bakeri*, n. sp., holotype (*h* from lateral view).

Holotype male, Barra do Tapirape, Mato Grosso, Brazil, January 9, 1968 (B. Malkin) (CAS).

O. repetita, n. sp., is smaller than other species in the genus, and can be identified readily by the form of the aedeagus.

Oragua bakeri, NEW SPECIES

FIGURE 525, PAGE 642

Length of male 7.2 mm, of female 7.3-9.0 mm. Head with median length of crown varying from four-tenths to less than one-half interocular width and approximately three-tenths transocular width; ocelli located on a line between anterior eye angles, surface of crown not punctate; antennal ledges with anterior margins convex; transclypeal suture obsolete medially. Pronotum obscurely rugulose, not punctate; scutellum without sculpturing; forewing with membrane including almost all of apical cells and abruptly delimited from remainder of wing, base of fourth apical cell located more proximally than base of third, wing surface not punctate before membrane. Male pygofer with macrosetae mostly of uniform size, occurring on posterior two-thirds; plates not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae; style not extending posteriorly nearly as far as apex of connective, with preapical lobe, apex broad and truncate; aedeagus with shaft short, straight, convex apically, with a pair of broad basal processes arising lateroventrally and truncate apically and a pair of inconspicuous short ventral lobes at midlength; paraphyses consisting of a large basal portion and slender, elongate, tapering rami regularly curved dorsally then posteriorly in lateral view. Female abdominal sternum VII well produced with posterior margin oblique on each side of a median apical angle that is much less strongly produced than in *Oragua stylata* (Signoret) (fig. 500*i*).

Crown, pronotum, scutellum, clypeus, and forewings brown with small dull yellow spots and vermiculations, scutellum with a pair of laterobasal much larger pale spots; remainder of face, thoracic pleura, and legs, tan.

Holotype male and one female, Corumbá, Brazil, March; one female, same locality, April; two females, Chapada, Brazil, April and May (USNM, from the Baker collection).

The broad basal aedeagal processes serve to distinguish *O. bakeri,* n. sp., readily from other species in the genus. The species is named in honor of C. F. Baker whose collections from the New World tropics and from the Philippine area have contributed greatly to our knowledge of the Cicadellinae.

85. ACRULOGONIA, NEW GENUS

FIGURES 526-536

Type-species: *Poeciloscarta smidti* Metcalf.

Length of male 6.9-8.0 mm, of female 6.8-7.6 mm.

Head weakly produced, median length of crown varying from slightly less than one-half to slightly less than six-tenths interocular width, and from

three-tenths to slightly less than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly before a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, crown with middle of disk convex or very slightly concave medially, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant in dorsal view, in lateral view with anterior margins vertical and rectilinear, clypeus slightly flattened medially, muscle impressions distinct or not, transclypeal suture obscure medially, clypellus with profile of its lower portion slightly more nearly horizontal than remainder of contour of face.

Thorax with pronotal width equal to or less than transocular width of head, lateral margins parallel or slightly convergent, dorsopleural carinae complete, posterior margin slightly concave, disk without sculpturing; scutellum not transversely rugose behind transverse sulcus. Forewing with membrane absent or limited to inner apical cell or to inner two apical cells, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins, texture translucent to opaque. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer scarcely to moderately produced with a posterodorsal process varying interspecifically in position from anteapical to apical, and with an additional process (also varying interspecifically) in some species, macrosetae varying from two to approximately twenty, limited to apical half of pygofer. Plates varying interspecifically in extent relative to pygofer apex, in shape, and in chaetotaxy. Style extending posteriorly beyond apex of connective (exception: *A. reclusa*, n. sp.), with or without preapical lobe. Connective variable interspecifically. Aedeagus symmetrical, shaft elongate, apex abruptly curved at a right angle to long axis of shaft (exception: *reclusa*), shaft usually with at least one pair of processes. Paraphyses absent.

Female abdominal sternum VII slightly produced and gradually narrowed to a bluntly convex or a shallowly concave apical margin. Genital chamber with sclerites in dorsal membrane or with dorsal wall entirely sclerotized. Ovipositor with broad, toothed area of each second valvula occurring through most of length except curved basal portion, the primaries sloping, regular, and with numerous secondary denticles, apex narrowly rounded, with anteapical posterodorsal and posteroventral denticles.

Species of *Acrulogonia*, new genus, are pale to dark brown, sprinkled with pale dots and small spots and occasionally with pale vermiculations, and in some species with pale to orange larger spots on the forewings. The forewings are translucent and often with dark red veins.

The range of *Acrulogonia* is from Panama, Venezuela, and Colombia to the Guianas, and northeastern Brazil and Peru and Bolivia. *Acrulogonia* belongs to the *Oragua* Melichar complex of genera, and is probably more closely related to *Oragua* than to other genera in the complex. For distinguishing characters, see the discussion of *Oragua*.

The present interpretation of *Tettigonia mucidula* Jacobi, and of *Cicada tristis* Fabricius is based on a study of the male lectotypes of those nominal species.

SPECIES OF *ACRULOGONIA*

chocona, n. sp. Colombia.
defectiva, n. sp. Colombia.
fuscinula, n. sp. Peru.
incompta, n. sp. Peru, Bolivia.
mucidula (Jacobi), 1905c:222 (*Tettigoniella*). Peru. New combination.
ordinaria, n. sp. Panama.
pararesima, n. sp. Costa Rica, Panama.
reclusa, n. sp. Venezuela.
resima, n. sp. Br. Guiana, NE. Brazil.
smidti (Metcalf) (new name), 1965a:82 (*Poeciloscarta*). Br. Guiana, Fr. Guiana. New combination.
tristis (Fabricius), 1803a:74 (*Cicada*) (preoccupied).
sparsa, n. sp. Colombia.

KEY TO MALES OF *ACRULOGONIA*

1. Plates not extending posteriorly as far as pygofer apex 2
   Plates extending posteriorly beyond pygofer apex 9

2. Pygofer with a conspicuous process extending posteriorly from near middle of dorsal margin ..... *fuscinula,* n. sp., page 646
   Pygofer process arising more distally on dorsal margin 3

3. Pygofer process slender, extending posteriorly beyond pygofer apex which is narrowed and not or only slightly wider than the process (fig. 527*c*); pygofer with a group of few setae on disk and with or without second group at apex 4
   Pygofer process not as above, or if so then pygofer apex not narrowed, broader than process; pygofer with setae more numerous and more widely distributed 6

4. Aedeagus with a pair of lateral processes near base (fig. 527*f*) *chocona,* n. sp., page 646
   Aedeagus without lateral processes near base (with ventral processes slightly more distally, or not) 5

5. Aedeagus with a pair of slender apical processes exceeding apex of shaft *mucidula* (Jacobi) (fig. 528*g*)
   Aedeagus without processes exceeding apex of shaft (fig. 529*f*) *incompta,* n. sp., page 648

6. Dorsal pygofer process strongly decurved in lateral view (fig. 530*f*) *resima,* n. sp., page 650
   Dorsal pygofer process not strongly decurved 7

7. Pygofer relatively short and broad, aedeagus with retrorse lateral processes on apical half of shaft ..... *defectiva,* n. sp., page 650
   Pygofer longer and more slender, aedeagus without such processes 8

8. Dorsal pygofer process well developed, extending posteriorly to or beyond pygofer apex ..... *ordinaria,* n. sp., page 652
   Dorsal pygofer process weak, short, not attaining pygofer apex *smidti* (Metcalf) (fig. 531)

9. Aedeagus with a median ventral keel in apical half *reclusa,* n. sp., page 654
   Aedeagus without a median ventral keel 10

10. Aedeagus in lateral view more strongly arched, with only one pair of anteapical processes ..... *sparsa,* n. sp., page 654
    Aedeagus in lateral view less strongly arched except apically, with two pairs of anteapical processes ..... *pararesima,* n. sp., page 656

Acrulogonia fuscinula, NEW SPECIES

FIGURE 526, PAGE 647

Length of male 7.5 mm, of female 6.8 mm. Head with median length of crown slightly less than half interocular width, and one-third transocular width, crown in lateral view very slightly concave across ocelli. Pronotum with width less than transocular width of head, forewings with texture translucent. Male pygofer with a strong process arising near midlength of dorsal margin, extending posteriorly, tapering, acute apically in lateral view, but bifid at apex in dorsal view, pygofer apex acute in lateral view, setae few and anteapical; plates slender and triangular, weakly fused basally, not extending posteriorly nearly as far as pygofer apex, with macrosetae in an irregular group from near base to apex; style without preapical lobe; connective very narrow, U-shaped; aedeagus with a short acute unpaired dorsal process before apex of shaft and a pair of lateral slender tapering processes extending in axis of basal portion of shaft beyond decurved shaft apex. Female abdominal sternum VII with posterior margin almost transverse, with a slender median excision that is deeper than wide (in unmacerated specimen).

Color of dorsum including forewings, brown with numerous gray dots, a few gray vermiculations on forewings; face dark with a median and two lateral longitudinal pale stripes (tan in type, orange in female) on clypeus; pleura, venter, and legs brown to black.

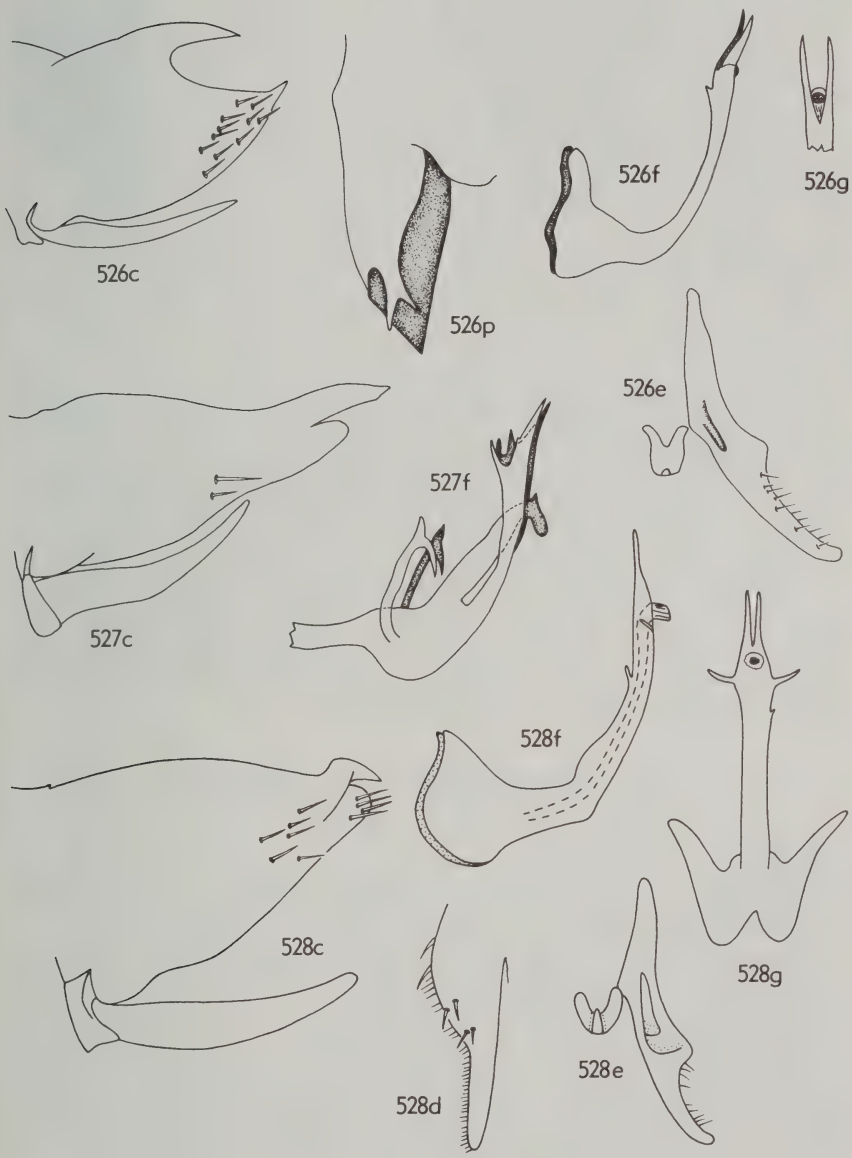
Holotype male, Chiriaco [River], Peru, September 9, 1968 "hierbas" [herbage] (D. Ojeda P.); and one female, same data except collector ("Koytkowski"), both in USNM.

The form of the pygofer and its processes, and the long-shanked styles will separate *A. fuscinula,* n. sp., from other species in the genus.

Acrulogonia chocona, NEW SPECIES

FIGURE 527, PAGE 647

Length of male 7.1 mm. Head with median length of crown slightly less than six-tenths interocular width, and approximately one-third transocular



FIGURES 526-528.—526, *Acrulogonia fuscinula,* n. sp., holotype (only aedeagal apex shown in *g*): *p,* Male pygofer apex, left side, from dorsal view. 527, *A. chocona,* n. sp., holotype. 528, *A. mucidula* (Jacobi), lectotype.

width, crown in lateral view not concave. Pronotum and forewings as in *A. fuscinula,* n. sp.. Male pygofer slender and elongate with posterodorsal margin produced posteriorly into a tapering, acute process and exceeding pygofer apex which is a narrow and strongly convex lobe scarcely wider than adjacent process, with two macrosetae near posteroventral margin near its midlength; plates slender and triangular, narrowed in basal half, with uniseriate setae in basal two-thirds of their length, otherwise as in *fuscinula;* style with lateral lobe near midlength, connective Y-shaped with arms more divergent than in *fuscinula;* aedeagus with a pair of slender processes arising laterally on shaft near its base, extending dorsolaterally, each bifid apically with the longer ramus extending posteroventrad, with pair of larger processes arising ventrally on shaft distal to bases of the preceding, extending dorsally, broadened and giving off several branches at apex, the apices not symmetrical, without processes arising near decurved apical portion of shaft. Female unknown.

Color of crown and anterior portions of pronotum shining castaneous, with a pair of black spots near base on crown; remainder of pronotum, scutellum and forewings duller brown, the forewings translucent, marked with small white spots and a larger pale spot on corium opposite mid-clavus, longitudinal veins of corium and margins of apical cells reddish; clypeus marked as in *fuscinula,* apex of clypellus and genae pale; thoracic pleura and legs tan.

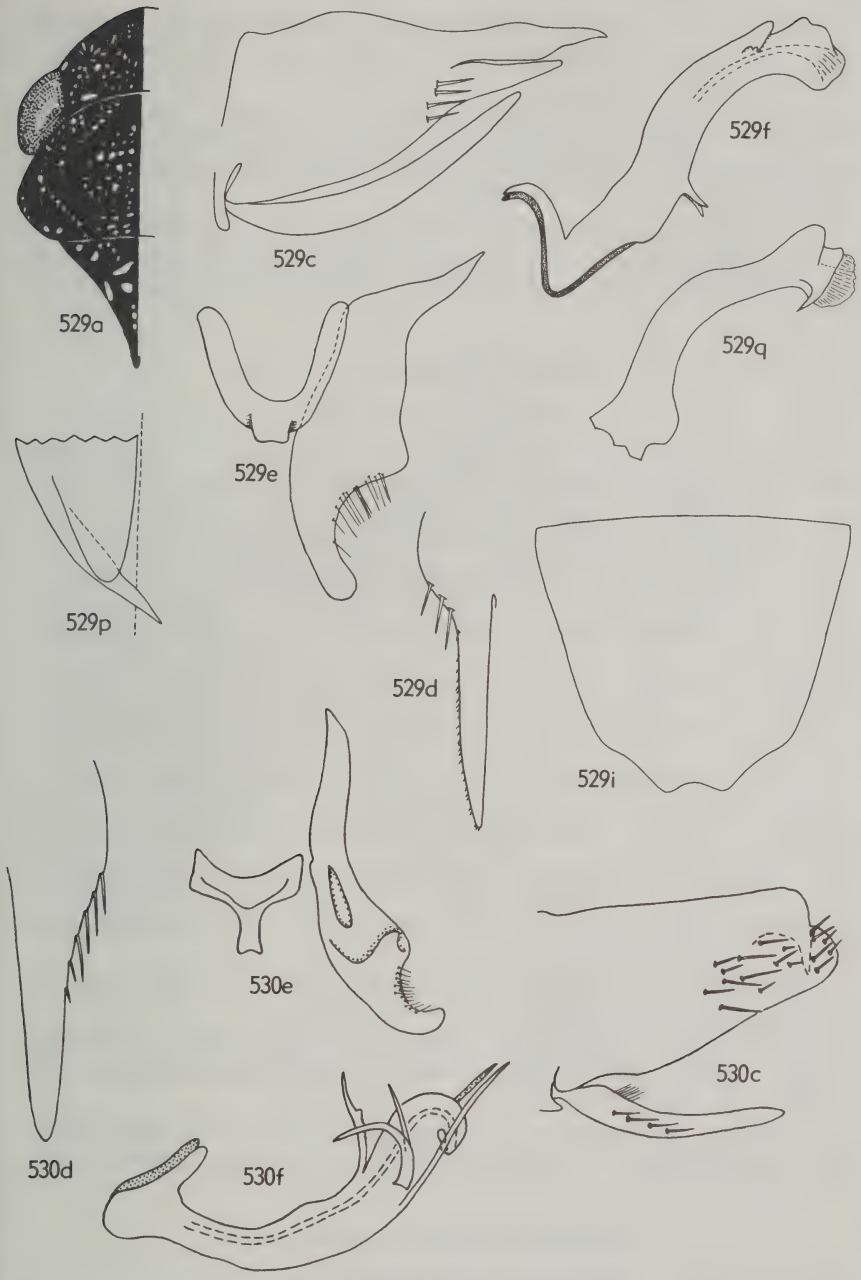
Holotype male, Camp Curiche, Choco Dept., Colombia, 1967 (OSU).

A. chocona, n. sp., is similar in form to *A. mucidula* (Jacobi) and *A. incompta,* n. sp., in the form of the pygofer. The male plates, styles and connective, not illustrated, are similar to those structures in *A. smidti* (Metcalf) (fig. 531). The distinctive aedeagus of *chocona* and the characters used in the key will serve to distinguish it from other species in the genus.

Acrulogonia incompta, NEW SPECIES

FIGURE 529, PAGE 649

Length of male 7.6-8.0 mm, of female 6.9-7.6 mm. Head with median length of crown varying from slightly less than one-half to almost six-tenths interocular width, and from three-tenths to slightly more than one-third transocular width, crown in lateral view not concave across ocelli. Pronotum with width equal to or less than transocular width of head, forewings with texture translucent. Male pygofer as in *A. chocona,* n. sp., plates slender and triangular, narrowed in basal halves, weakly fused basally, not extending posteriorly as far as pygofer apex, with macrosetae uniseriate on broader basal portion on each plate; style with a lateral lobe at midlength of shank; connective broadly U-shaped; aedeagus curved slightly posteriorly in its apical half, with a pair of short aciculate processes arising on ventral margin of shaft near base, and a pair of short variable dorsal processes arising anteapically and directed ventrally, without any processes extending beyond apex of shaft. Female abdominal sternum VII with posterior margin gradually tapered to broad weak apical lobe that is broadly, shallowly concave at middle.



FIGURES 529, 530.—529, *Acrulogonia incompta,* n. sp., (*p* from specimen from Marcapata, Peru; *i* from topotype; remainder from holotype): *p,* Male pygofer apex, left side, from ventral view; *q,* apical portion of aedeagus, from lateral view. 530, *A. resima,* n. sp. (specimen from Territorio Amapá, Brazil).

Color of entire dorsum, including forewings, brown irregularly dotted with pale. Face, pleura, and legs as in *A. fuscinula,* n. sp., (above) except lora, which are pale.

Holotype male and one female, Hacienda María, Cuzco, Peru, March 18, 1952 (F. L. Woytkowski); one female, Marcapata, Peru (NCS). Two males and two females, Coroico, Bolivia (OSU). Holotype on indefinite loan to USNM from NCS.

A. incompta, n. sp., is similar to *A. chocona,* n. sp., and *A. mucidula* (Jacobi) in the form of the pygofer, but is readily separated from both of these species by the aedeagal shaft being gradually curved posteriorly in its apical half.

Acrulogonia resima, NEW SPECIES

FIGURE 530, PAGE 649

Length of male 6.4-6.9 mm. Head with median length of crown slightly more than six-tenths interocular width and slightly more than one-third transocular width, crown in lateral view very slightly concave across ocelli. Pronotum narrower than transocular width of head, forewings with texture translucent. Male pygofer with a posterodorsal process which is decurved before pygofer apex and not as broad as apical rounded lobe of pygofer, the process acute apically, setae much more numerous than in *A. incompta,* n. sp.; plates slender and triangular, tapering gradually near midlength, weakly fused basally, not extending posteriorly nearly as far as pygofer apex, with small uniseriate macrosetae near midlength; style and connective much as in *incompta,* but connective Y-shaped with stem short; aedeagus curved dorsally except apex of shaft which is decurved, with an elongate slender acute unpaired dorsal process arising at midlength of shaft, a pair of lateral processes extending anteriorly at right angles to axis of shaft, each bifid with slender rami, and a pair of long slender tapering acute processes arising ventrally on shaft and extending apically, parallel to long axis of shaft, beyond its apex, the origin of the paired processes in a transverse line with base of the dorsal process. Female unknown.

Color of dorsum as in *incompta,* face, pleura and legs pale tan, weakly and not distinctly marked with darker.

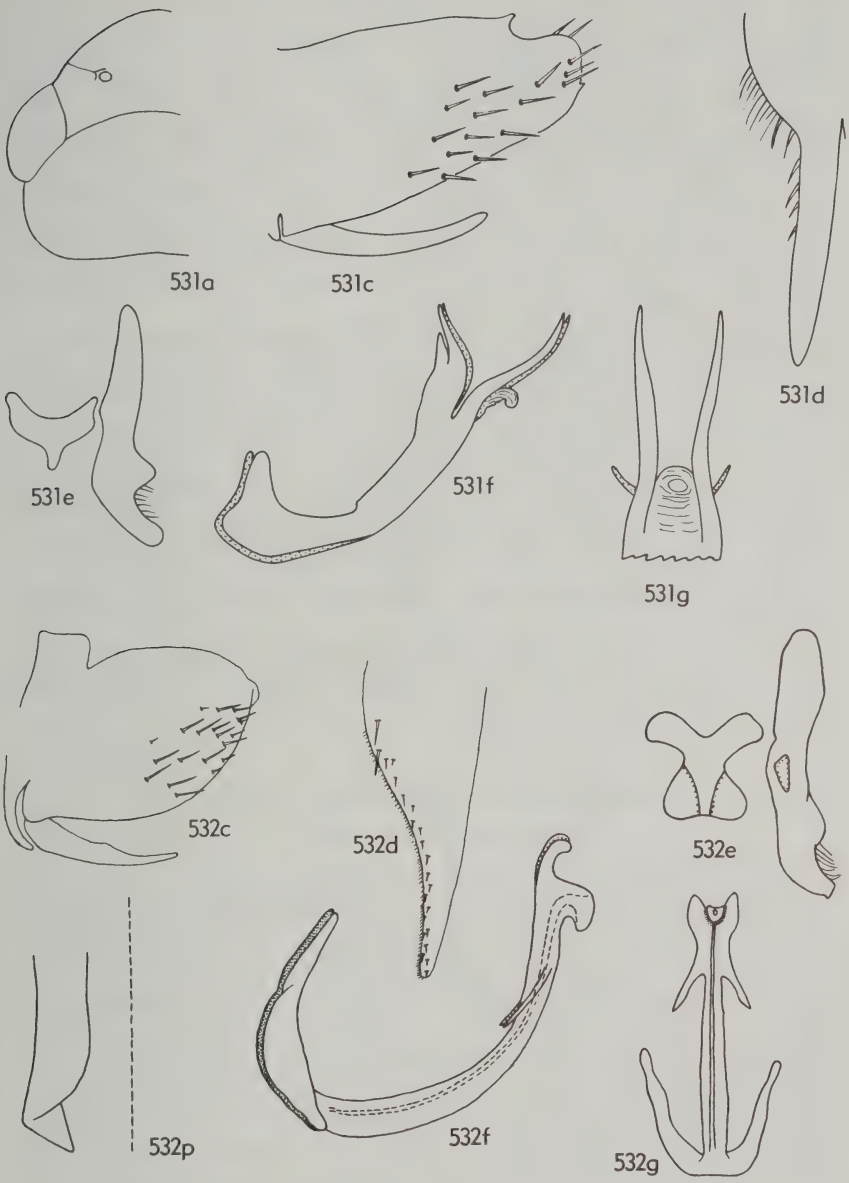
Holotype male, Upper Courantyne River, September, 1935 (G. A. Hudson) (B.M.). One male, Alto Amapari, Territorio Amapá, Brazil, October 8, 1957 (J. Lane) (J. Lane collection).

A. resima, n. sp., is close to *A. incompta,* n. sp., but is easily distinguished from this and from other species of the genus by the decurved pygofer process.

Acrulogonia defectiva, NEW SPECIES

FIGURE 532, PAGE 651

Length of male 8.0 mm. Head with median length of crown approximately one-half interocular width and one-third transocular width, crown in lateral view not concave. Pronotum with width approximately equal to transocular



FIGURES 531, 532.—531, *Acrulogonia smidti* (Metcalf) (from lectotype of *Cicada tristis* F.; markings not shown in *a;* only aedeagal apex shown in *g*). 532, *A. defectiva,* n. sp., holotype: *p,* Male pygofer apex, left side, from dorsal view.

width of head, forewings with texture translucent. Male pygofer with posterodorsal margin terminating in a short triangle that extends mesad but is not differentially sclerotized, and not nearly as broad as the apical portion of the pygofer below, posterior pygofer margin broadly and regularly convex below this process, setae comparatively numerous for the genus, arising on apical half of pygofer; plates triangular, broad for the genus, weakly fused basally, not extending posteriorly nearly as far as pygofer apex, setae not uniseriate; style and connective as in *A. incompta,* n. sp., but with connective Y-shaped, very broad; aedeagus long and slender, curved regularly dorsad, with a pair of slender acute retrorse processes arising laterally on shaft beyond its midlength, with a pair of short apical rounded processes extending slightly beyond apex of shaft. Female unknown.

Color of crown, anterior portion of pronotum and of scutellum rich brown with pale spots and vermiculations and with a darker area bordering apex of crown in dorsal view, remainder of pronotum and forewings darker brown with small pale spots of irregular size, with most of the longitudinal veins of the corium and veins bordering apical cells red; clypeus and clypellus dark with a median longer, and a shorter lateral, paler stripe on each side of clypeus and a pale spot on each side of clypellus, a spot on each lorum and posterior margin of genae, pale, remainder of face dark, venter and legs from pale tan to dark brown.

Holotype male, Colombia, 1942 (L. Richter) on indefinite loan to USNM from NCS.

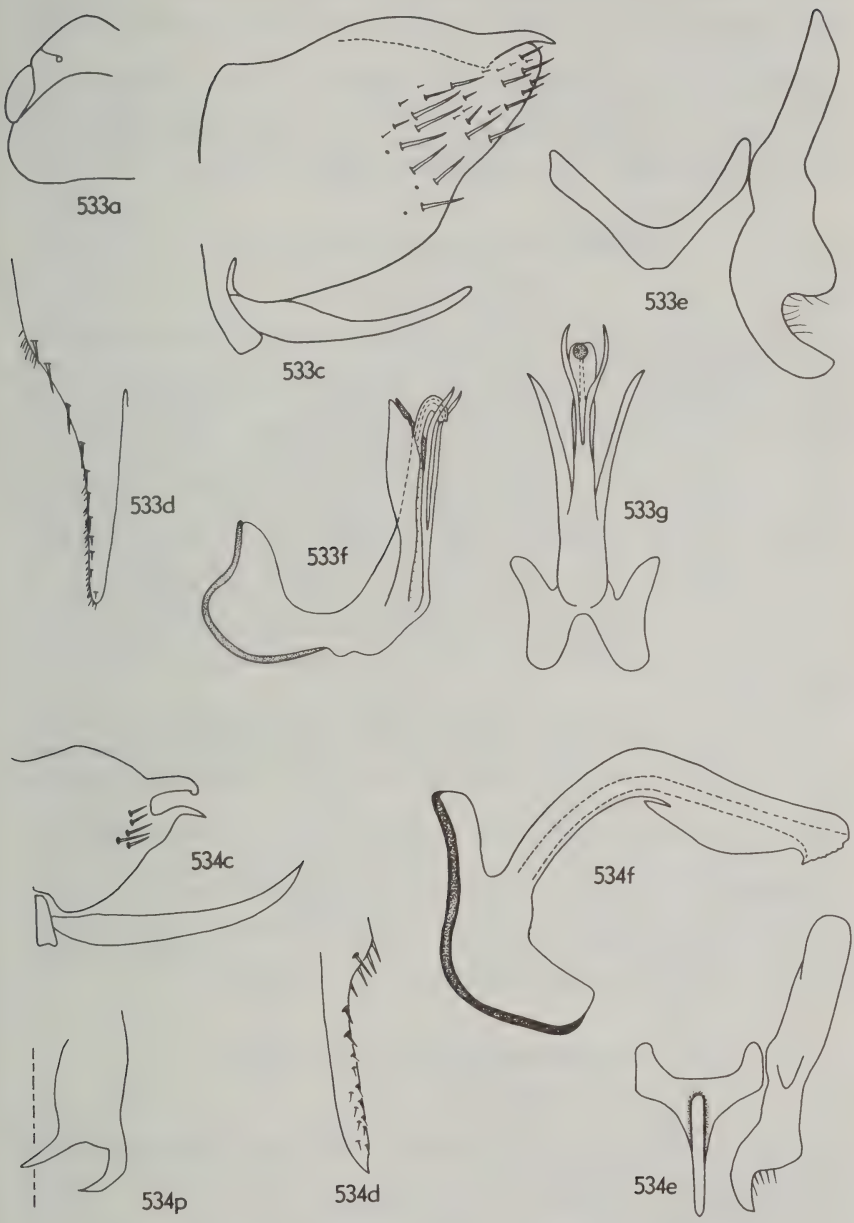
A. defectiva, n. sp., may be separated from other species in the genus by the form of the male pygofer process, which is merely an undifferentially sclerotized lobe that extends mesad.

Acrulogonia ordinaria, NEW SPECIES

FIGURE 533, PAGE 653

Length of male 7.3-7.6 mm. Head with median length of crown slightly more than one-half interocular width and approximately one-third transocular width, crown in lateral view slightly concave across ocelli. Pronotum with width equal to transocular width of head, forewings with texture translucent. Male pygofer with a strong acute process arising anteapically, extending posteriorly beyond pygofer apex, but not nearly as wide as adjoining posterior lobe of pygofer, pygofer with numerous setae on apical half; plates slender and triangular, weakly fused basally, not extending posteriorly nearly as far as pygofer apex, each with uniseriate macrosetae in apical two-thirds of length; style and connective as in *A. incompta,* n. sp.; aedeagus with shaft curved dorsally, except apical portion, with a pair of lanceolate lateral processes arising near base of shaft, extending dorsally and slightly anteriorly approximately as far as apex of shaft, and a Y-shaped ventral process arising between bases of preceding processes, the arms of the "Y" extending slightly beyond apex of shaft. Female unknown.

Color brown sprinkled with dull white spots on several sizes, with a pair of darker markings on crown and with two transparent spots on each corium,



FIGURES 533, 534.—533, *Acrulogonia ordinaria,* n. sp., holotype (markings not shown in *a*). 534, *A. reclusa,* n. sp., holotype: *p,* Male pygofer, left side, from ventral view.

veins of forewing mostly dull red; face dark brown with three longitudinal markings on clypeus, and a spot on each lorum paler; thoracic pleura black, legs brown.

Holotype and one additional male, Potrerillos, Panama, May 14, 1935 (NCS). Holotype on indefinite loan to USNM.

A. ordinaria, n. sp., is similar to *A. chocona,* n. sp., from which it differs in its wider posterior pygofer lobe and different aedeagal processes.

Acrulogonia reclusa, NEW SPECIES

FIGURE 534, PAGE 653

Length of male 8.0 mm. Head with median length of crown approximately one-half interocular width and three-tenths transocular width, crown in lateral view without a concavity across ocelli. Pronotum with width equal to transocular width of head, forewings with texture translucent. Male pygofer short, with two curved apical processes both directed mesad at their apices, discal setae few, occurring in a cluster in apical half, plates slender, not fused at base, narrowed near base, acute apically, extending posteriorly well beyond pygofer apex, setae multiseriate; style with distinct preapical lobe, connective Y-shaped with the arms widely divergent, extending posteriorly as far as apices of styles; aedeagus arched, extending dorsally then posteriorly, with a median ventral keel in apical half, its anterior extremity acute, without paired processes, gonoduct at apex not curved at right angle to long axis of shaft. Female unknown.

Color brown with irregular pale markings, with apex and two small spots at base of crown, black, and a number of conspicuous red spots on forewings; face black with few vermiculate pale spots on clypeus; pleura dark; legs pale tan.

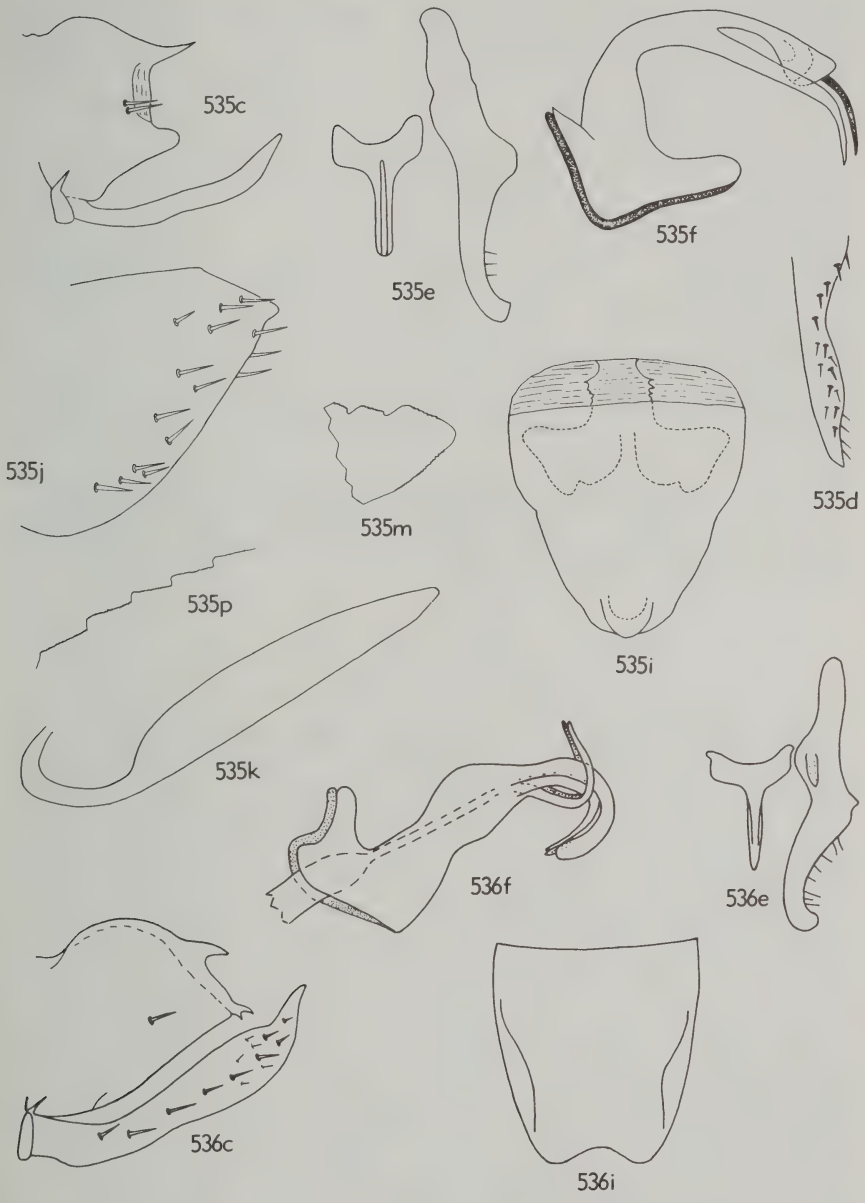
Holotype male, Rancho Grande, Venezuela, March 28, 1945 (AMNH).

A. reclusa, n. sp., differs from most other species in the genus in its shorter male pygofer, longer plates which are separate at their bases, and in the aedeagus which is strongly arched in an opposite manner to most of the other species. These characters are shared by *A. sparsa,* n. sp. (below), in the discussion of which distinguishing characters are considered.

Acrulogonia sparsa, NEW SPECIES

FIGURE 535, PAGE 655

Length of male 6.5-7.3 mm, of female 6.9-7.3 mm. Head with median length of crown varying from slightly less than one-half to slightly less than six-tenths interocular width and from approximately three-tenths to slightly less than four-tenths transocular width, crown in lateral view without a concavity across ocelli. Pronotum with width less than transocular width of head, forewings opaque. Male pygofer short, with an acute posterodorsal process extending posteriorly and slightly mesally, posterior pygofer margin vertical with a slight ventral lobe, with very few setae near middle of posterior half of disk,



FIGURES 535, 536.—535, *Acrulogonia sparsa*, n. sp., (*i, k, m, p,* from topotype; remainder from holotype; sclerite of genital chamber shown in *i*): *p,* Basalmost teeth of second valvula. 536, *A. pararesima,* n. sp. (*i* from topotype; remainder from holotype).

plates slender, not fused at base, narrowed near base and before apex, extending posteriorly well beyond pygofer apex, setae not uniseriate; style without preapical lobe; connective as in *A. reclusa,* n. sp., but not extending as far posteriorly as apex of styles; aedeagus arched as in *A. resima,* n. sp., shaft with a pair of slender tapering ventral processes arising at its midlength, extending beyond apex of shaft, curved gradually ventrally apically; apex of shaft obliquely truncate. Female abdominal sternum VII moderately produced posteriorly, with lateral margins gradually tapered to broadly convex apex, with a slight median apical tumescence.

Color pale brown sprinkled with irregular small pale spots, or dark brown with fewer larger pale tan to orange spots, both varieties with three larger pale to orange spots on corium of forewings; face pale tan to dark brown, thoracic pleura very dark, legs much paler brown.

Holotype and two additional males and two females, Choco Department, Camp Curiche, Colombia, 1967; five males and ten females, Darién Province, Santa Fé, Panama, June 2, 1967. (D. M. DeLong and C. A. Triplehorn) (OSU).

A. sparsa, n. sp., has many similarities to *A. reclusa,* n. sp., discussed above. It differs from *reclusa* in the paired processes of the aedeagus, the single process of the pygofer, the male plate being widened anteapically, and in the lack of a preapical lobe on the style.

Acrulogonia pararesima, NEW SPECIES

FIGURE 536, PAGE 655

Length 8.1 mm. Head with median length of crown slightly less than six-tenths interocular width and from slightly more than one-third to slightly more than four-tenths transocular width, crown in lateral view very slightly concave across ocelli. Pronotum equal in width to transocular width of head, forewings opaque. Male pygofer with dorsal margin more heavily sclerotized than remainder, with an anteapical dorsal process and an apical bifid process with short rami, disk of pygofer with a single seta near middle; plates elongate, exceeding pygofer apex, broadened anteapically, acute apically, with setae uniseriate basally, multiseriate near apex; style much as in *A. incompta,* n. sp.; connective Y-shaped with stem longer than arms; aedeagus much as in *A. resima,* n. sp., but with shaft narrower anteapically and more strongly decurved apically. Female abdominal sternum VII moderately produced posteriorly with posterior margin broadly, shallowly concave; genital chamber with a large dorsal plate. A dome-shaped structure of unknown homology occurs between the first valvifers; it has two heavily sclerotized conical peaks.

Color of dorsum varying shades of brown, with numerous minute pale spots and vermiculations, with a triradiate dark spot at apex of crown, and two pale red suboval spots broadly bordered with black on corium of forewing near costa; face and thoracic pleura dark with at least some paler marking on face; legs pale brown.

Holotype male and one female, Turrialba, Costa Rica, June 8, 1951 (O. L. Cartwright) (USNM).

A. pararesima, n. sp., is similar in some respects to *A. resima,* n. sp., but is readily separable by its longer male plates and distinctive male pygofer. It is also very similar to *A. sparsa,* n. sp., differing in the curvature of the aedeagus and the aedeagal processes (see key), and also in the form of the pygofer apex which is truncate in *sparsa.*

86. TUBIGA, NEW GENUS

FIGURE 537

Type-species: *Tubiga debilis,* new species.

Length of male 8.1-8.7 mm.

Head with median length of crown varying from slightly more than four-tenths to slightly more than one-half interocular width, and from slightly more than one-fourth to three-tenths transocular width, ocelli located on a line between anterior eye angles, each distinctly closer to adjacent anterior eye angle than to median line of crown, crown convex, without a concavity across ocelli, without a median fovea, surface densely punctate, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and slightly concave; clypeus punctate, flattened, muscle impressions distinct, surface without pubescence, transclypeal suture interrupted at middle; clypellus punctate with profile of its lower portion more nearly horizontal than remainder of contour of face.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin shallowly concave, disk densely punctate and in some specimens transversely rugulose, not pubescent; scutellum densely punctate, not transversely rugulose behind transverse sulcus. Forewing with membrane including all of apical cells and adjoining apical portion of costal area, veins distinct, with four apical cells of which base of fourth is more proximal than base of third, with three closed anteapical cells with bases more proximal than claval apex, without an anteapical plexus of veins, texture coriaceous and densely punctate except membrane. Hindleg with femoral setal formula 2:1:1, length of first tarsomere slightly more than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Male pygofer broadly convex apically, with an undifferentialy sclerotized angularity on posteroventral margin, with a group of numerous macrosetae parallel to posterior margin, and a group of microsetae below these. Plates not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae. Style extending posteriorly as far as apex of connective, with a weak preapical lobe. Connective Y-shaped. Aedeagus slender, elongate, regularly curved dorsally and posteriorly, with a pair of short processes on atrium and a pair of slender apical shaft processes extending dorsally, gonopore anteapical and ventral. Paraphyses absent.

Female unknown.

Tubiga, new genus, is known only from the type-species, from Colombia and Ecuador.

Tubiga, is in the *Oragua* Melichar complex of genera discussed in the treatment of the latter genus and is more closely related to *Oragua* than to other genera in the complex. It can be readily separated from *Oragua* (except *O. partitula* (Jacobi)) by its lack of paraphyses.

Tubiga debilis, NEW SPECIES

FIGURE 537

Structural characters as in generic description. Crown tan, remainder of dorsum varying from tan to black, with paler markings. Dark (typical) form: pronotum black with a tan or orange spot behind each eye and a narrow tan connection between the spots along the anterior pronotal margin, forewing black with approximately 20 pale round, oval, or vermiculate markings in clavus and corium. Pale form: anterior dorsum tan without pronotal markings, forewing concolorous with markings much less distinct than in dark form. Face and venter tan in both forms, with an oval paler mark on face. Legs tan.

Holotype and two additional males, Choco Dept., Camp Curiche, Colombia, 1967 (OSU), and one male, Cachabe [Cachabi?], Ecuador, "low c.", January 1897 (Rosenberg) (BM). The last is slightly damaged and has been repaired. It is the tan form, the other specimens being much darker.

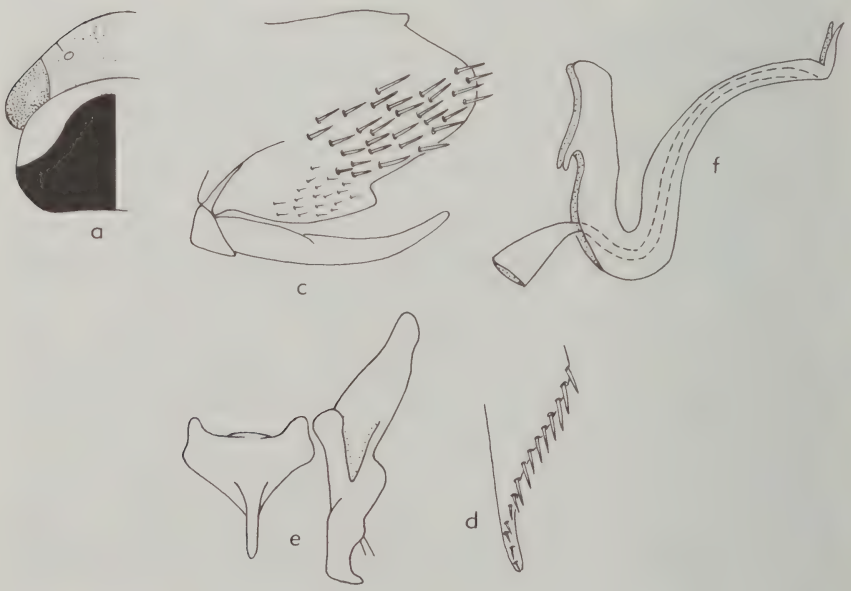


FIGURE 537.—*Tubiga debilis*, n. sp. (*a* from holotype; remainder from Cachabe, Ecuador).

87. SELVITSA, NEW GENUS

FIGURES 538-545

Type-species: *Tettigonia humeralis* Signoret.

Length 8.5-13.5 mm.

Head scarcely or only slightly produced, median length of crown from one-third to one-half interocular width and from one-fifth to one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown usually convex, with or without a slight concavity across ocelli, without a median fovea, surface with or without sculpturing, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins rectilinear and either vertical or oblique; clypeus convex or flattened, muscle impressions indistinct, surface without pubescence, transclypeal suture interrupted or entire, clypellus variable in profile, continuing contour of clypeus or with its apical portion curved abruptly posteroventrally.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete or not, posterior margin shallowly concave, disk transversely rugose, not pubescent; scutellum not striate or only minutely rugulose behind transverse sulcus. Forewing with membrane including all of apical cells, veins distinct or not, scarcely elevated, with four apical cells, the base of fourth variable (intraspecifically in *S. vermiculata,* n. sp.) in relation to base of third, without an anteapical plexus of veins, texture coriaceous and punctate or without sculpturing; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere equal to or greater than combined length of two more distal tarsomeres and with two parallel rows of small setae, the rows joined apically by additional similar setae, on plantar surface.

Male genitalia: Pygofer moderately produced, with a very few to more than twenty macrosetae, variable interspecifically in location but not regularly dispersed over surface, apical margin bearing a process (exception: *S. exaireta,* n. sp.). Plates triangular, fused basally, extending as far or almost as far posteriorly as pygofer apex, with short, usually multiseriate macrosetae. Style extending posteriorly to a varying degree with relation to apex of connective, with preapical lobe weak or wanting. Connective short, variable in form, often somewhat papilioniform, not keeled. Aedeagus variable. Paraphyses usually absent (present in *exaireta*).

Female abdominal sternum VII broad and fairly short, posterolateral lobes developed or not, with a narrow median posterior projection which is acute or truncate apically. Dorsal membrane of genital chamber, with or without a conical invagination near first valvifer (when present scarcely visible in dried specimens), with or without sclerites. Ovipositor with second valvulae broad almost throughout their length, dorsal margins varying from regularly convex to slightly concave near midlength, with primary teeth usually convex and

with minute secondaries, the basal and apical primaries often largest, dorsoapical margin of each rectilinear or slightly concave, bearing small teeth like those on posteroventral margin.

Selvitsa, new genus, belongs to the *Oragua* Melichar generic group, discussed in the treatment of the latter genus. It differs from all of the other genera in the group except *Scoposcartula,* new genus, in that the ocelli are located behind a line between the anterior eye angles. Male pygofer processes are usually present in *Selvitsa,* absent in *Scoposcartula.* Paraphyses are usually absent in *Selvitsa;* present in *Scoposcartula.* The pronotum is wider than the head in *Scoposcartula;* narrower in *Selvitsa.* Similarities between *Selvitsa* and *Aguahua,* new genus, are discussed in the treatment of the latter.

The genus *Selvitsa* occurs in the area from Panama to southeastern Brazil and to Bolivia, but series are short, and no specimens have been seen, to date, from Colombia and Peru, nor from the Guianas.

The male genitalia of the lectotype of *Tettigonia humeralis* Signoret are illustrated (fig. 545). The present interpretation of *Cicadella cinctosula* Osborn rests on a male specimen compared with a female specimen from the Carnegie Museum and labeled "holotype". *Tettigoniella cachabensis* Distant is interpreted on the basis of a male compared with the female lectotype.

In the females studied, there are differences in the shape of the first valvifer which appear to be specific. These are not illustrated here because not enough specimens were available to check the constancy within a given species.

SPECIES OF *SELVITSA*

buscki, n. sp. Panama.
cachabensis (Distant), 1908a:517 (*Tettigoniella*). Ecuador. New combination.
cinctosula (Osborn), 1926b:193 (*Cicadella*). W. Brazil. New combination.
exaireta, n. sp. Venezuela.
humeralis (Signoret), 1853b:369 (*Tettigonia*). E. and SE. Brazil. New combination.
ibena, n. sp. Bolivia.
tenofa, n. sp. W. Brazil.
vermiculata, n. sp. Venezuela.

KEY TO SPECIES OF *SELVITSA*

1. Forewings with conspicuous transverse pale bands or stripes 2
   Forewing markings not transverse, often inconspicuous 4
2. Forewings at rest with at least one transcommissural marking 3
   Forewings at rest with pale spots not attaining commissural margin
   tenofa, n. sp., page 661
3. Forewings with transverse markings very broad
   cinctosula (Osborn) (fig. 539)
   Forewings with transverse markings very narrow
   exaireta, n. sp., page 667
4. Forewings each with a humeral pale spot
   humeralis (Signoret) (fig. 545)
   Forewings without a humeral pale spot 5

5. Forewings each with brachial cell entirely red or orange (occurs in Panama) ..... *buscki*, n. sp., page 666
   Forewings with brachial cell not colored as above, occasionally (*cachabensis* (Distant)) with orange border to claval suture lying within clavus (occurs in South America) 6

6. Forewings with color markings consisting of dull whitish to dull red vermiculations ..... *vermiculata*, n. sp., page 664
   Forewings not as above 7

7. Species smaller, length less than 9.0 mm, forewings with longitudinal orange markings ..... *cachabensis* (Distant) (fig. 541)
   Species larger, length 11.0-12.0 mm, forewings without orange markings *ibena*, n. sp., page 663

Selvitsa tenofa, NEW SPECIES

FIGURE 538, PAGE 662

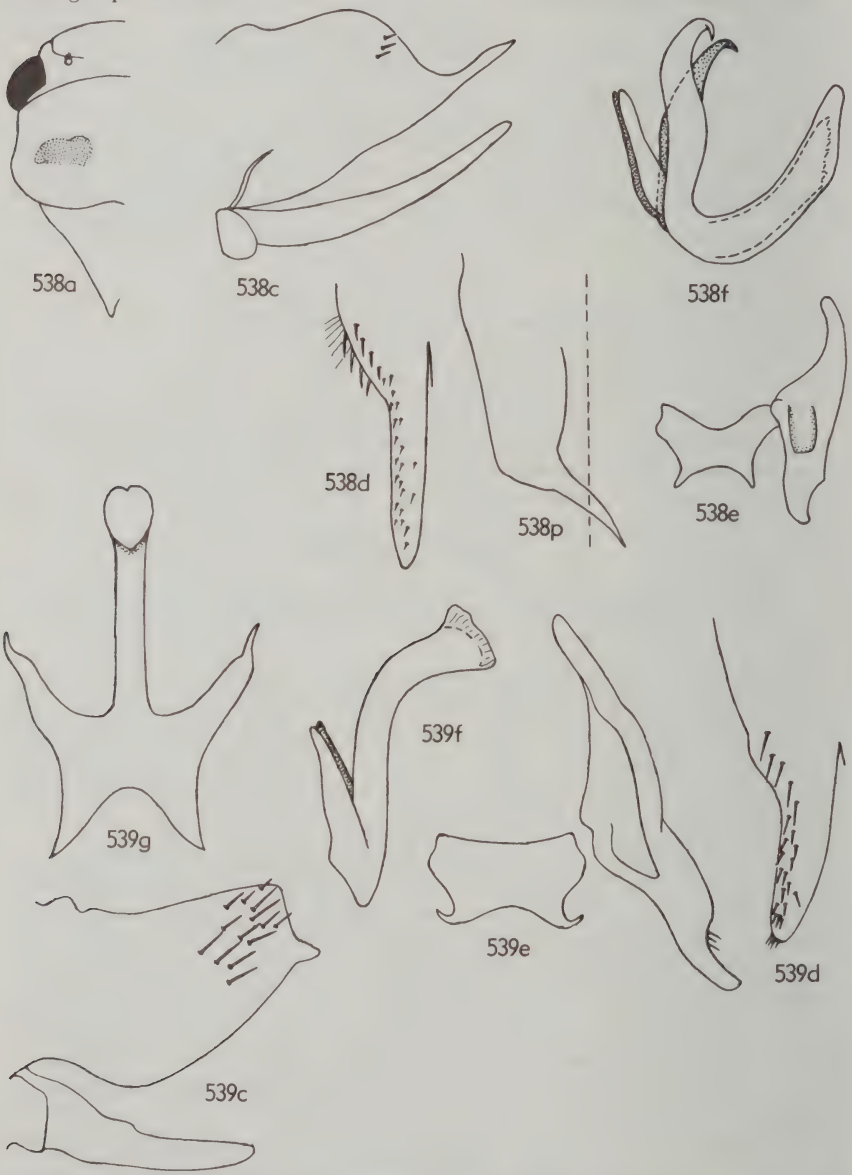
Length of male 13.5 mm, of female 13.0 mm. Head with median length of crown from one-third to slightly more than four-tenths interocular width, and from one-fifth to slightly more than one-fourth transocular width, crown convex with a slight concavity across ocelli, surface without sculpturing; antennal ledges in lateral view with anterior margins oblique; clypeus flattened, transclypeal suture entire, clypellus with apical portion curved abruptly posteroventrally. Pronotum with dorsopleural carinae complete. Forewing with veins not distinct, base of fourth apical cell more distal than base of third.

Male pygofer abruptly narrowed posteriorly, produced into an acute process which is directed dorsally and mesally, crossing median line, with very few submarginal dorsal macrosetae beyond midlength of dorsal margin; plates extending posteriorly almost as far as apex of pygofer process, each with a number of short multiseriate macrosetae; style extending posteriorly only slightly beyond apex of connective, with a weak preapical lobe; connective short, somewhat papilioniform; aedeagus short, curved gradually dorsally, with pair of processes arising on atrium, extending dorsally, gradually tapered and bisinuate, the apices narrow, acute, and directed posteriorly; paraphyses absent. Female abdominal sternum VII with lateral lobes not strongly developed, with an acute median projection from posterior margin.

Color of crown and anterior portion of pronotum dull yellow, with a pair of transverse discal deeper yellow pronotal spots which are bordered posteriorly with purple; scutellum concolorous with crown; forewing purple, irregularly sprinkled with small irregular yellow spots and with three transverse spots in corium, one opposite midclavus, one before claval apex and the third before bases of apical cells, all three margined with immaculate purple, type with an additional much smaller yellow claval marking opposite scutellar apex; face, pleura, venter, and legs, stramineous, tarsal apices black.

Holotype male, "Pebas", Upper Amazon, and one female, Fonteböa, Upper Amazon, Brazil (RMS).

S. tenofa, n. sp., is closely related to *S. ibena*, n. sp. (below), from which it differs in the larger size, its coloration, and its broader and more sinuous aedeagal processes.



FIGURES 538, 539.—538, *Selvitsa tenofa*, n. sp., holotype: *p*, Male pygofer apex, right side, from ventral view. 539, *S. cinctosula* (Osborn) (from specimen from Purús River, Amazonas).

Selvitsa ibena, NEW SPECIES

FIGURE 540

Length of male 12.0 mm, of female 11.0 mm. Head with median length of crown approximately one-third interocular width and one-fourth transocular width, disk of crown concave, surface with a group of radiating rugae on each side of middle; antennal ledges in lateral view with anterior margins almost vertical; clypeus flattened. Other external characters as in *S. tenofa,* n. sp.

Male pygofer subtruncate apically in lateral view, with an apical aciculate process which is directed mesally, with a few macrosetae parallel to posterior margin; plates extending posteriorly almost as far as apex of pygofer, each with a number of short multiseriate macrosetae; style very short, extending posteriorly slightly beyond apex of connective, without a preapical lobe; connective as in *tenofa;* aedeagus as in *tenofa* but shaft not curved dorsally as much and with the atrial processes more slender and extending dorsally, straight almost to their apices which are curved slightly posterodorsally and acute; paraphyses absent. Female abdominal sternum VII with lateral lobes well developed, with median posterior projection broad basally, gradually narrowed to apical portion which is slender and truncate apically.

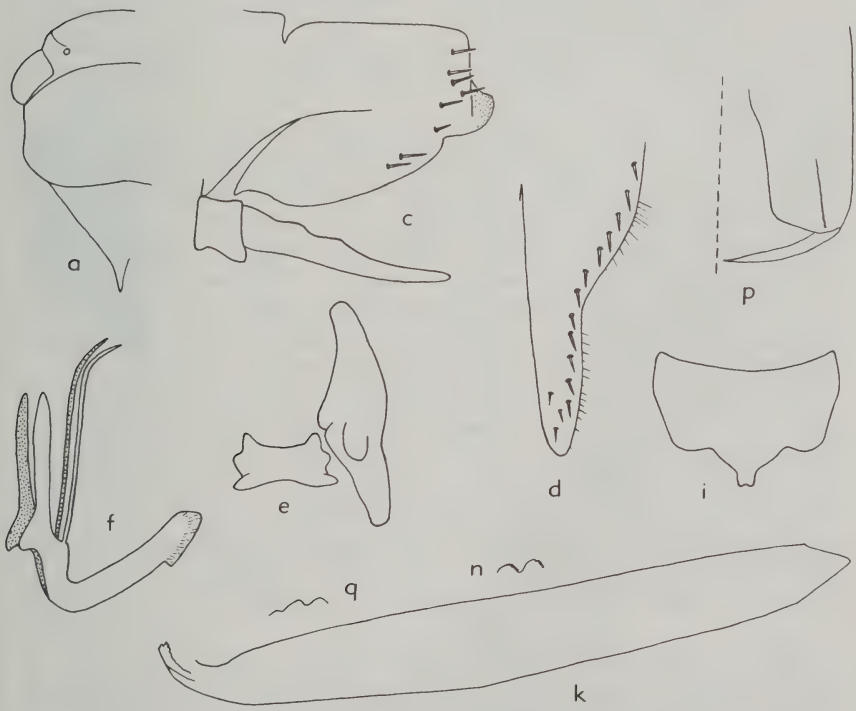


FIGURE 540.—*Selvitsa ibena,* n. sp. (*i, k, n. q,* from specimen from Mapiri, Bolivia; remainder from holotype): *p,* Male pygofer, left side, from caudoventral view; *q,* teeth near base of second valvula.

Color of dorsum, including forewings, tan (type) to tan anteriorly but with forewings dull brick-red, a few irregular vermiculate markings near humeral angles in both clavus and corium, a number of irregular small black spots across wing at midlength in type, claval suture and some irregular markings before bases of apical cells, black; face, pleura, and legs stramineous (type) to dull brown, tarsi black.

Holotype and one additional male, Coroico, Bolivia (OSU); and one female, Mapiri, Bolivia (MMB).

S. ibena is closely related to *S. tenofa,* in the treatment of which distinguishing characters are discussed.

Selvitsa vermiculata, NEW SPECIES

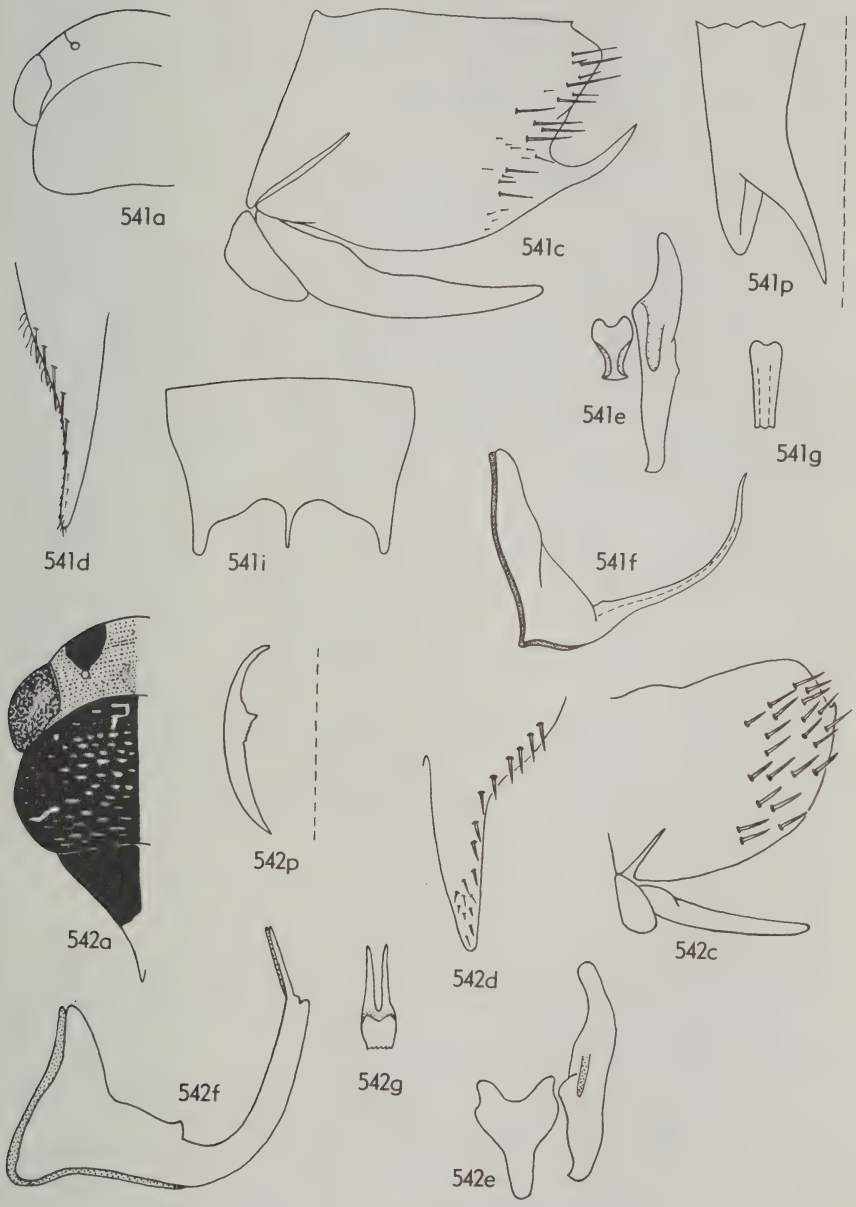
FIGURE 542, PAGE 665

Length of male 11.2 mm, of female 10.4-10.5 mm. Head with median length of crown from slightly more than four-tenths to one-half interocular width and from more than one-fourth to less than one-third transocular width, crown concave or not between ocelli, surface without sculpturing; clypeus convex, transclypeal suture entire or not. Pronotum with dorsopleural carina not attaining posterior margin of eye. Forewing with veins not very distinct, base of fourth apical cell variable (even in a single specimen) with relation to base of third apical cell. Other external structural characters as in *S. tenofa,* n. sp.

Male pygofer with apical margin broadly convex and bearing at midlength a reduced triangular process, with a number of macrosetae on posterior half of disk; plates not extending as far posteriorly as apex of pygofer, each with a number of short multiseriate macrosetae; style not extending as far posteriorly as apex of connective, without a preapical lobe, slightly angulate at apex; connective short, Y-shaped; aedeagus slender, of almost uniform width throughout length of shaft, which is curved dorsally, apex with a pair of symmetrical spinelike processes; paraphyses absent. Female abdominal sternum VII with posterolateral lobes poorly developed, much as in *tenofa.*

Color of crown, anterior portion of pronotum, and most of scutellum, dull yellow, crown occasionally (indistinctly in holotype) more darkly marked on areas of muscle impressions, posterior two-thirds of pronotum brick-red with numerous dots and short transverse markings yellow; forewings brick-red, with numerous small pale spots and vermiculations which tend to be aggregated into several poorly-delimited larger spots; face, pleura, and legs, unicolorous pale yellow to sordid brown (an atypical specimen with a pair of longitudinal, poorly-delimited black stripes over muscle impressions of clypeus).

Holotype male, Rancho Grande, near Maracay, Venezuela, March 18, 1946; a topotypic female, June 20, 1946; and one female, Tropical Research Station, New York Zoological Society, No. 45210, all in Bronz Zoo. One female, Aquas Negras, Distrito Federal, (Venezuela) (S. Vivas Berthier), December, 1936 (USNM).



FIGURES 541, 542.—541, *Selvitsa cachabensis* (Distant) (from specimens from Cachabé, Ecuador; only aedeagal apex shown in *g*): *p*, Male pygofer apex, right side, from ventral view. 542, *S. vermiculata*, n. sp., holotype (only aedeagal apex shown in *g*); *p*, Male pygofer, left side, from caudal view (heavily shaded portion of thorax in *a* is dull yellow).

In the USNM specimen, the wing coloring is darker and marked with brick-red to dull yellowish brown markings instead of the typical markings of the above description. *S. vermiculata*, n. sp., is quite different from the other species in the genus in its extremely short styles, in its greatly reduced pygofer process, and in the shape of its aedeagus.

Selvitsa buscki, NEW SPECIES

FIGURE 543

Length of male 8.7 mm, of female 8.5 mm. Head with median length of crown from approximately one-third to slightly less than four-tenths interocular width, and approximately one-fourth transocular width, crown with a slight concavity across ocelli; transclypeal suture incomplete, clypellus with apical portion scarcely curved posteroventrally, almost continuing contour of clypeus. Forewing with veins distinct, base of fourth apical cell more proximal than base of third, with or without a fifth apical cell. Other external characters as in *S. tenofa*, n. sp.

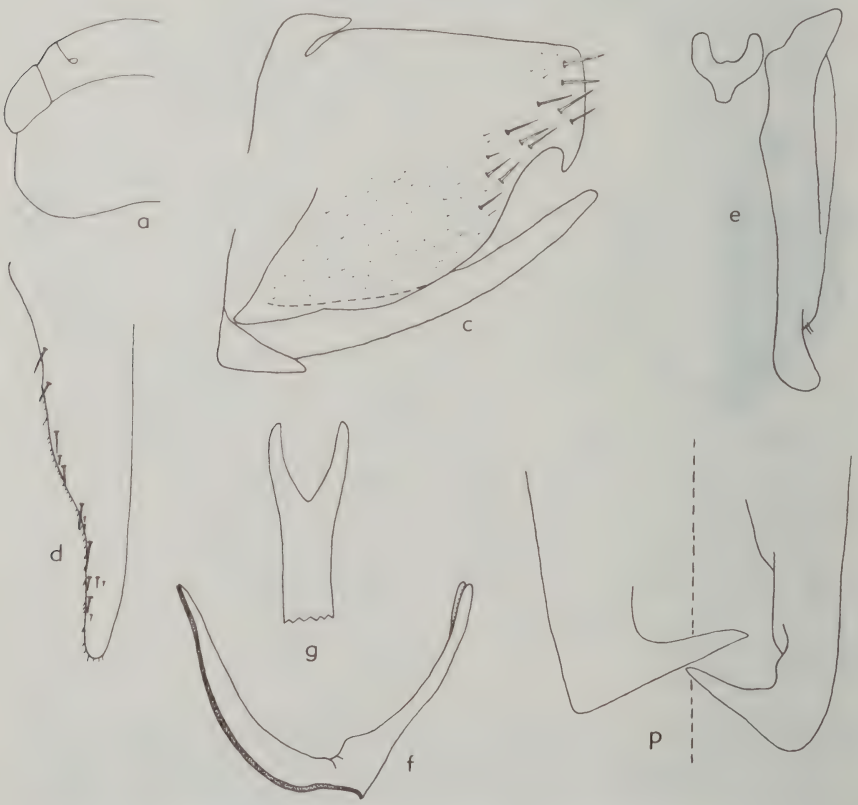


FIGURE 543.—*Selvitsa buscki*, n. sp., holotype (only aedeagal apex shown in *g*): *p*, Male pygofer apex from dorsal view.

Male pygofer not strongly produced, posterior margin vertical, with a tapering acute process arising near its midlength, extending mesally and slightly basally, crossing median line, with very few submarginal macrosetae near hind margin and a large number of minute microsetae on ventral half of disk; plates extending posteriorly as far as or slightly beyond pygofer apex, each with a number of short macrosetae which are mainly uniseriate; style extending posteriorly much beyond apex of connective, with a weak preapical lobe; connective short, Y-shaped, the stem not as long as arms which are not widely divergent; aedeagus slender, elongate, with shaft almost straight, bifurcate apically; paraphyses absent. Female abdominal sternum VII as in *S. cachabensis* (Distant) (fig. 541*i*).

Color of crown, pronotum, and scutellum sordid brown with a short median line at apex of crown, and several additional indistinct spots on crown and pronotum paler yellow, disk of crown suffused (type) or not with orange near each inner ocellar margin; forewing translucent gray, with veins broadly dark, with an irregular transverse fuscous band near midlength of corium not attaining costal margin nor claval suture, with brachial cell only (type) or in addition with band along costal margin, expanding apically into anteapical cells, dull orange; female with a slender bright orange mark along claval suture near its base; clypeus and clypellus brown, clypeus with a median narrow yellow stripe, bordered with darker brown; lora, genae, thoracic pleura, and legs, dull yellow to brown.

Holotype male, Porto Bello, Panama, May 13, 1911 (August Busck) and one female, Barro Colorado, Panama Canal Zone, March 14, 1929 (S. W. Frost) (USNM).

S. buscki, n. sp., is closely related to *S. cachabensis* (Distant), from which it differs in its more mesally directed pygofer processes, its longer apical aedeagal processes, and in its color. The species is named in honor of August Busck, formerly a curator of Lepidoptera at the U. S. National Museum.

Selvitsa exaireta, NEW SPECIES

FIGURE 544

Length of male 10.5 mm, of female 10.0-10.8 mm. Head with median length of crown from slightly more than four-tenths to slightly more than one-half interocular width and from slightly less to slightly greater than one-third transocular width, crown convex, without a concavity across ocelli, surface without sculpturing; clypeus convex.

Pronotum with dorsopleural carina not quite attaining posterior eye margin. Other external characters as in *S. tenofa,* n. sp.

Male pygofer not strongly produced, posterior margin abruptly rounded dorsally, without processes, with a number of macrosetae in a broad row parallel to posterior margin; plates not extending posteriorly nearly as far as apex of pygofer, each with a few lateral macrosetae near midlength and a number of much smaller multiseriate macrosetae in apical half; style extending posteriorly slightly beyond apex of connective, without a distinct

preapical lobe, truncate apically; connective V-shaped; aedeagus with shaft curved slightly dorsally in apical half, its apex rounded, with a pair of ventral processes arising at base, and extending posterodorsally beyond apex of shaft; paraphyses present, asymmetrical, consisting of a stalk and two rami arising in apical half, each curved slightly posteriorly and ventrally. Female abdominal sternum VII with posterolateral margins scarcely produced, with a median posterior slender angular projection.

Color of crown, pronotum, and scutellum, sordid yellow to sordid brown; forewings pale brown to dark brown, darker in color than crown, pronotum, and scutellum, each with a narrow stripe parallel to humeral and basal portion of inner claval margins, a short curved transverse marking before middle of clavus, and a similar one in apical half of clavus, the latter continuous with a transverse stripe across corium, with a parallel stripe across anteapical cells, an angular marking near base of corium, with or without additional variable markings in basal third of clavus, yellow; face, thoracic pleura, and legs, brown.

Holotype male, Cumaragua, Venezuela (B. J. Blanco) and one female, San Estebán, Venezuela, November 22-30, 1939 (Pablo Anduze) (USNM). One female, La Sierra, Cojeda, Venezuela, August 1946 (Villegas and Gines) (CAS).

S. exaireta, n. sp., differs from other species in the genus in its lack of pygofer processes, in its possession of paraphyses, and in the occurrence of ventral processes from the base of the shaft of the aedeagus.

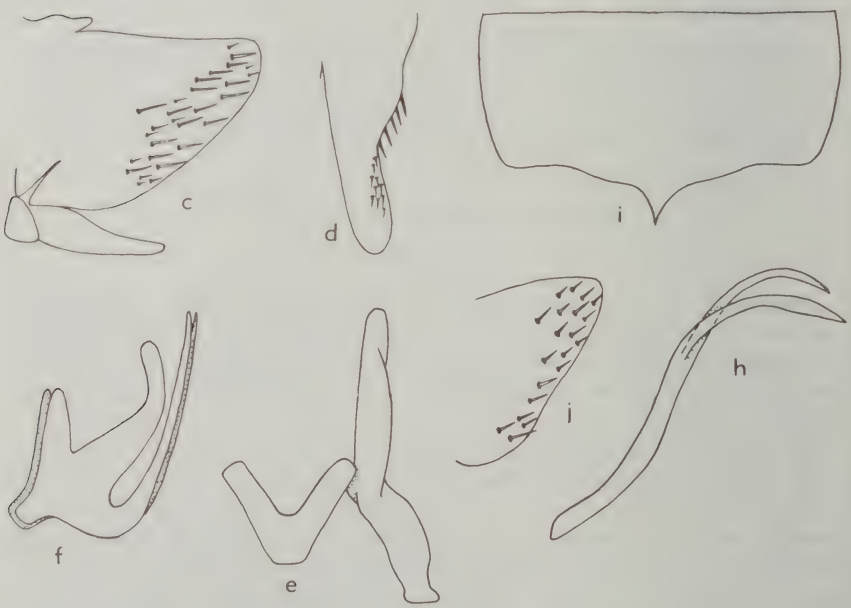


FIGURE 544.—*Selvitsa exaireta*, n. sp. (*i*, *j*, from specimen from La Sierra Cojeda, Venezuela; remainder from holotype; *h* from lateral view).

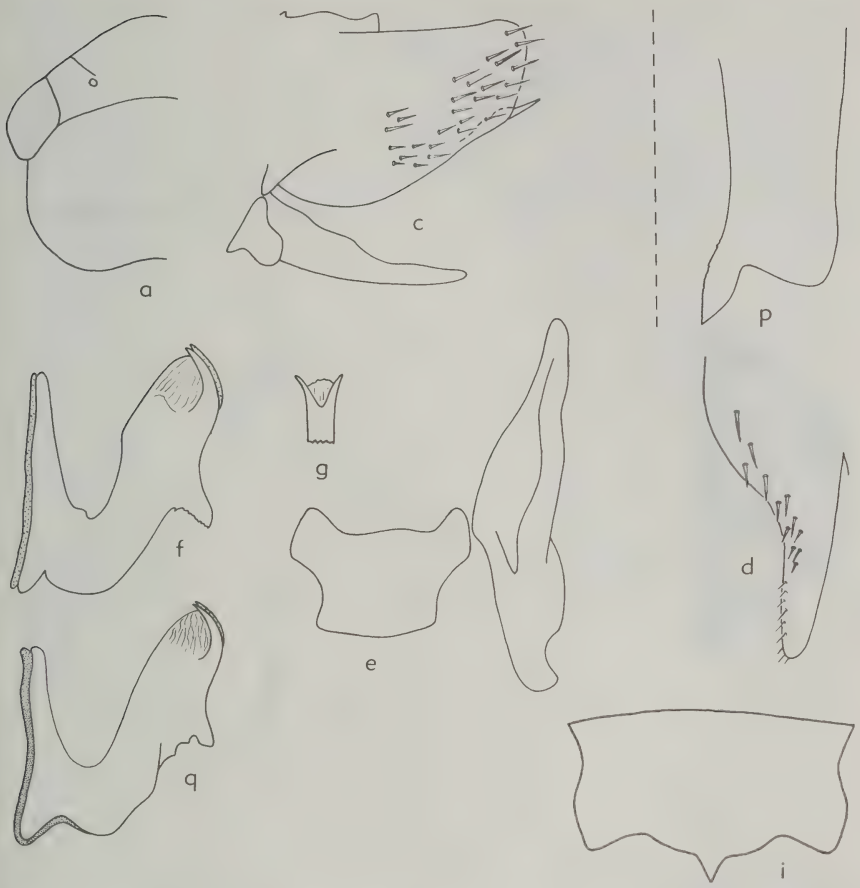


FIGURE 545.—*Selvitsa humeralis* (Signoret) (*q* from specimen from São Paulo, Brazil; *i* from Bahia, Brazil; remainder from lectotype; only aedeagal apex shown in *g*): *p*, Male pygofer, left side, from ventral view.

88. SCOPOSCARTULA, NEW GENUS

FIGURES 546-554

Type-species: *Tettigonia oculata* Signoret.

Length of male 8.1-13.9 mm, of female 9.0-13.3 mm.

Head moderately produced, median length of crown from slightly less than four-tenths to more than six-tenths interocular width and from one-fourth to almost four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located well behind a line between anterior eye angles, usually close to inner margin of eye and to posterior margin of head (exception: *S. inspergata* (Signoret) in which

they are approximately equidistant from inner eye margin and median line of head, and farther forward), crown convex, with or without a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins obliquely convex; clypeus slightly convex, not flattened, muscle impressions distinct, face without pubescence, transclypeal suture entire or interrupted, clypellus not produced, in profile continuing contour of clypeus or not, apical margin convex.

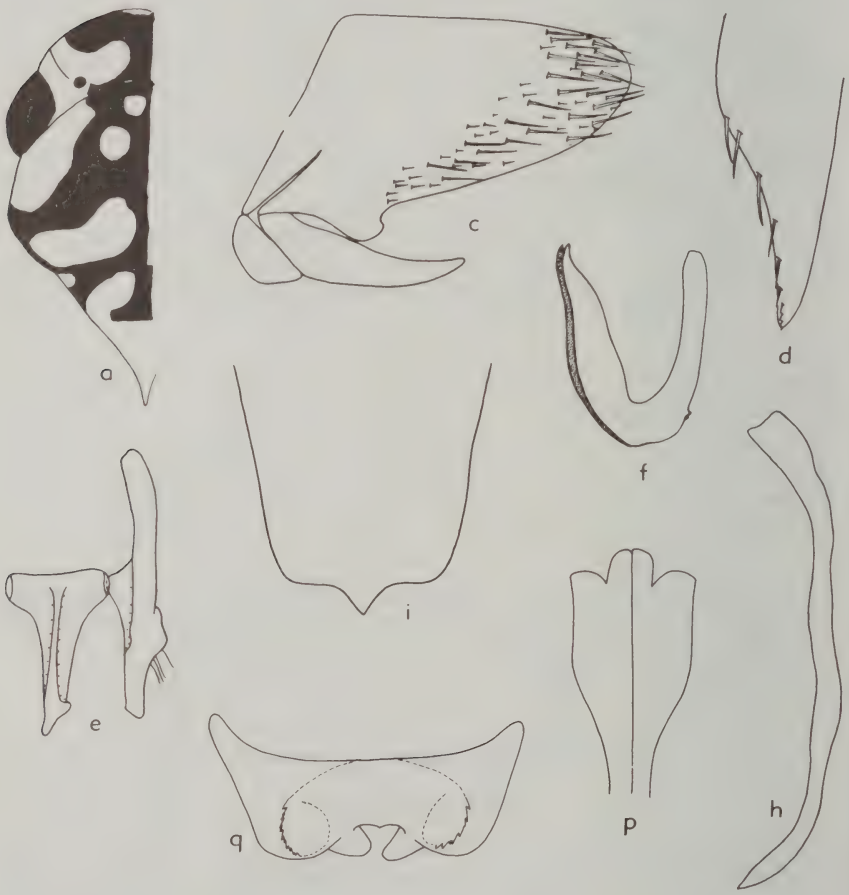


FIGURE 546.—*Scoposcartula basimacula* (Walker) (*i*, *p*, *q*, from specimen from unknown locality; remainder from Rio de Janeiro, Brazil; *h* from dorsal view): *p*, Bases of first valvulae from ventral view; *q*, sclerite of dorsal wall of genital chamber.

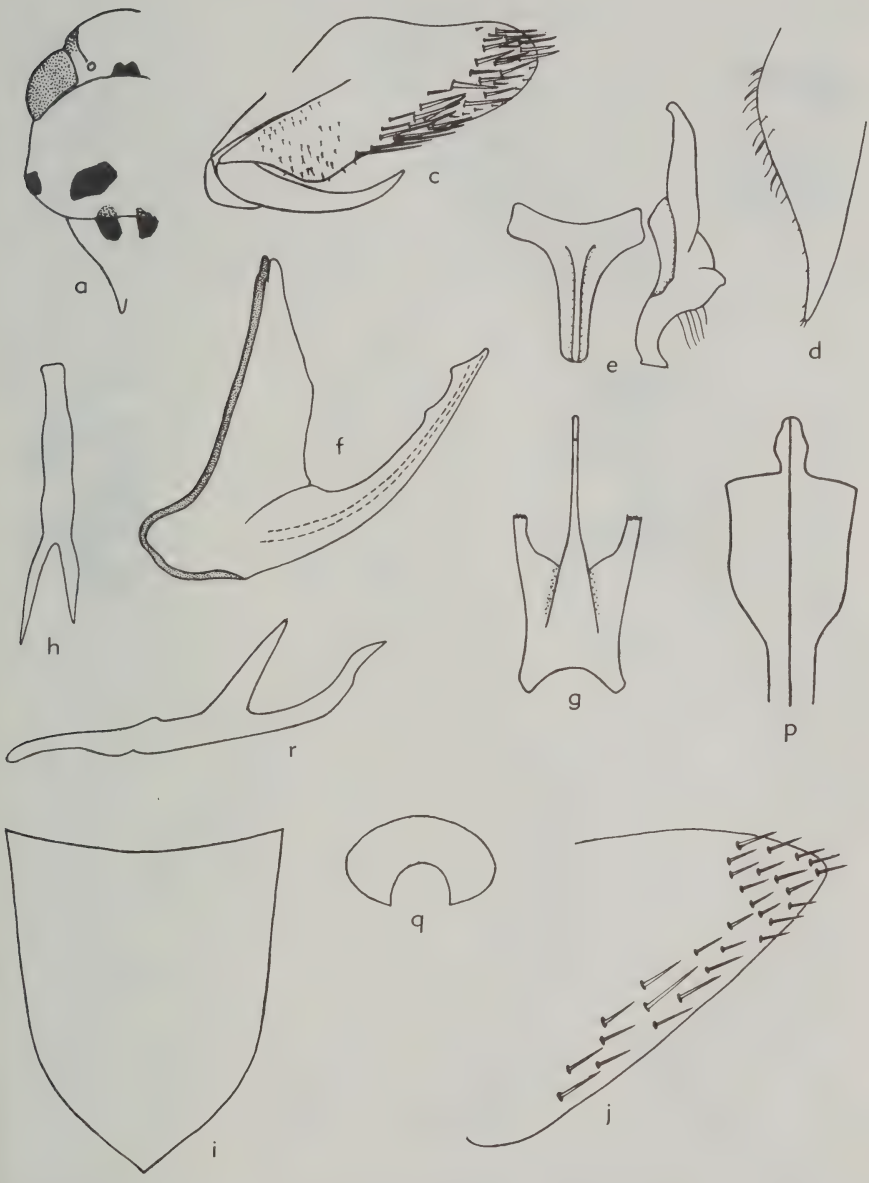
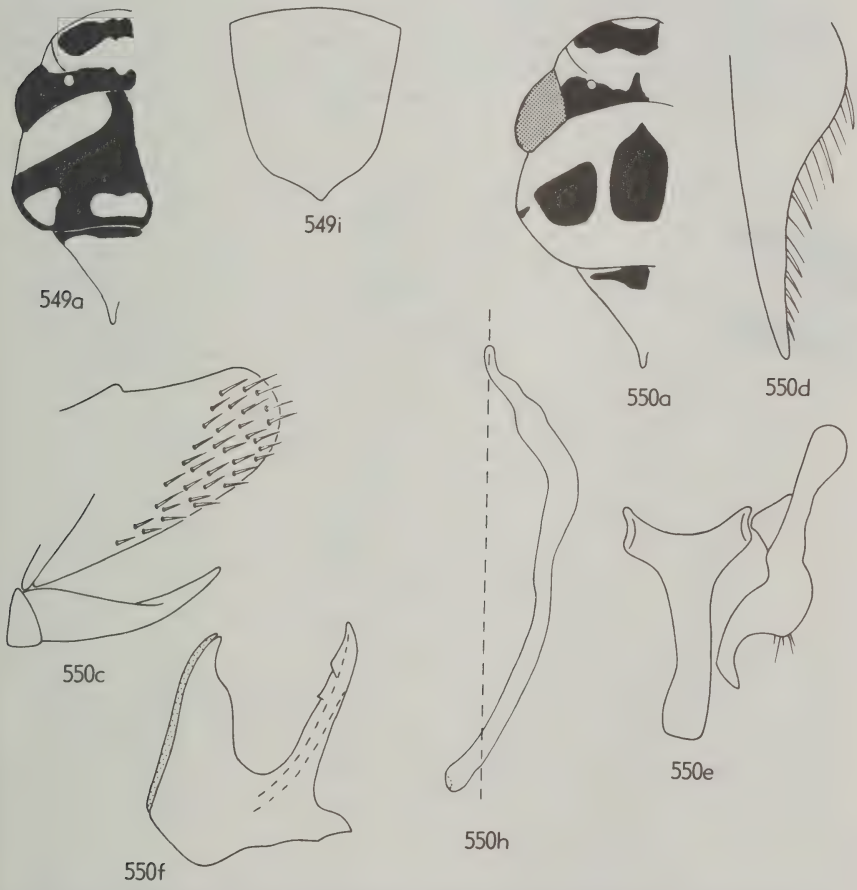


FIGURE 547.—*Scoposcartula perrisi* (Signoret) (*g, r,* from specimens from Paraguay; remainder from Chapada, Brazil; *h* from dorsal view): *p,* Bases of first valvulae of ovipositor from ventral view; *q,* sclerite of dorsal wall of genital chamber.

FIGURE 548.—*Scoposcartula limitata* (Signoret) (*i*, *k*, *m*, *p-r*, from specimen from Nova Teutonia, Brazil; *s*, from Chaco, Paraguay; *t* from Curitiba, Paraná, Brazil; remainder from Misiones, Argentina; *h* from lateral view): *p*, Basal portion of first valvulae from ventral view; *q*, dorsal sclerotization of genital chamber, from dorsal view; *r*, teeth near apex of second valvula; *s*, *t*, aedeagus from lateral view.

Thorax with pronotal width usually greater than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae usually complete, posterior margin usually concave (almost rectilinear in some specimens of *S. basimacula* (Walker)), disk without sculpturing or pubescence (exception: *lancifera,* n. sp. and some specimens of *basimacula*); scutellum not striate behind transverse sulcus. Forewing with membrane, veins usually not distinct, with four apical cells, base of fourth more proximal than base of third, without an anteapical plexus of veins, texture varying from translucent to coriaceous and with or without punctations; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere greater than combined length of two succeeding tarsomeres and with two parallel rows of small setae on plantar surface.



FIGURES 549, 550.—549, *Scoposcartula semipunctulata* (Melichar) (from specimen from Minas Gerais, Brazil). 550, *S. bilunata* (Signoret), lectotype (*h* from ventral view, *in situ*).

Male genitalia: Pygofer moderately produced, posterior margin convex, with numerous macrosetae on posterior half of disk and occasionally anteroventrally near base, without processes. Plates triangular, not extending as far posteriorly as pygofer apex, with macrosetae usually uniseriate (exception: *inspergata*, with multiseriate macrosetae). Style with length variable with respect to apex of connective, with lateral lobe distinct, apex varying from rounded to truncate or acute. Connective usually Y-shaped (exceptions: *S. bilimitata* (Signoret) in which it is broadly V-shaped, *lancifera* and *basimacula* in which it is somewhat T-shaped). Aedeagus symmetrical, with or without a process or pair of processes on shaft, with or without paired processes apically. Paraphyses present, varying from unpaired and asymmetrical to paired and symmetrical.

Female abdominal sternum VII produced and with posterior margin angulate medially (exception: *bilimitata* in which the median lobe is rounded). Genital chamber with or without dorsal sclerotization. Ovipositor with bases of first valvulae variable interspecifically; second valvulae with dorsal margin expanded in portion beyond basal curvature and bearing quadrate primary teeth

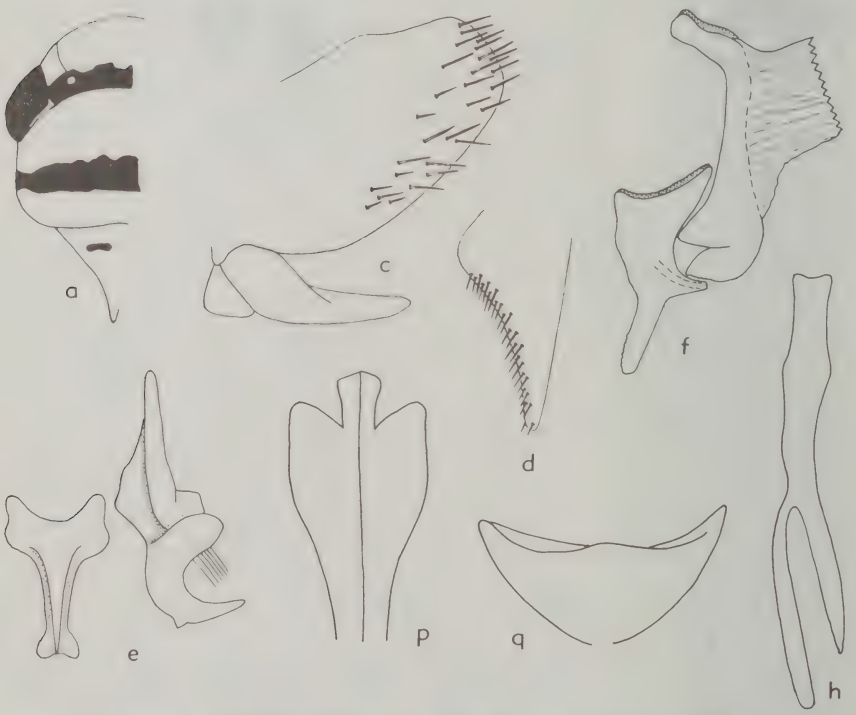


FIGURE 551.—*Scoposcartula inspergata* (Signoret) (*p*, *q*, from specimen from Mato Grosso, Brazil; remainder from Maranhão, Brazil; *f* showing base of anal tube; *h* from dorsal view): *p*, Basal portion of first valvulae from ventral view; *q*, sclerite of genital chamber from dorsal view.

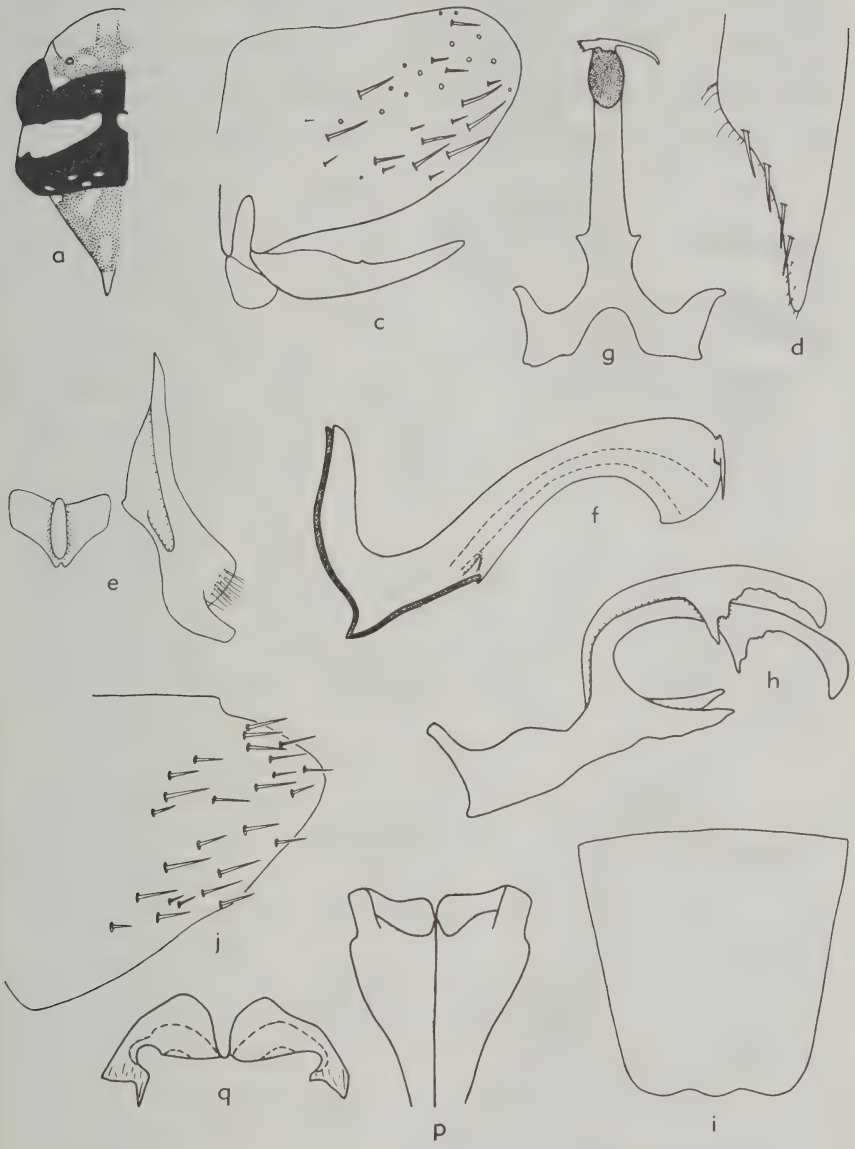


FIGURE 552.—*Scoposcartula bilimitata* (Signoret) (*i* from lectotype; remainder from specimens from Nova Teutonia, Santa Catharina, Brazil; *h* from lateral view): *p*, Basal portion of first valvulae from ventral view; *q*, sclerites of genital chamber from dorsal view.

each with secondaries, shape of apex variable interspecifically, apicoventral margin with fine denticulations. Pygofer with macrosetae on posterior half.

Specimens belonging to *Scoposcartula* new genus, have been collected from Costa Rica to southeastern Brazil and to Argentina, and from Bolivia. *Scoposcartula* belongs to the *Oragua* Melichar group of genera, discussed under the latter genus. In having the ocelli located behind a line between the anterior eye angles, it differs from all of the other genera except *Selvitsa,* new

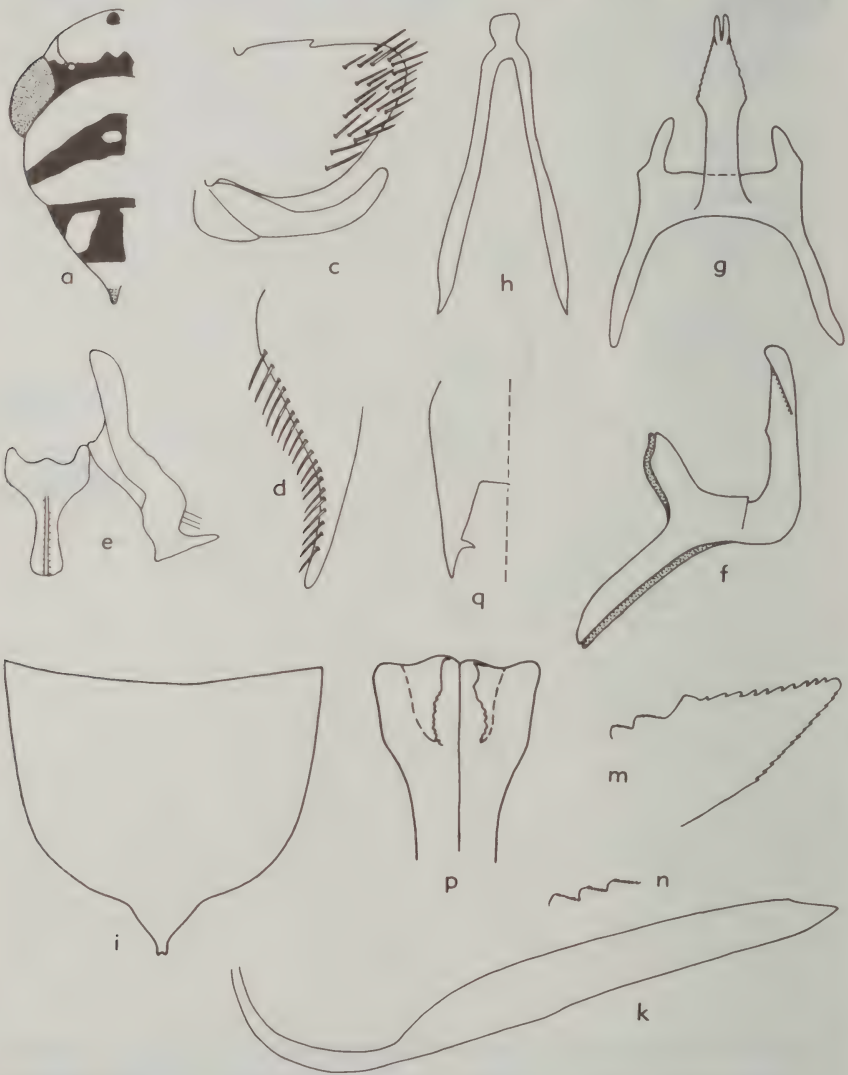


FIGURE 553.—*Scoposcartula oculata* (Signoret) (from specimens from Maracay, Venezuela; *h* from caudoventral view): *p*, Basal portion of first valvulae from ventral view; *q*, male pygofer apex, right side, from ventral view.

genus. Distinguishing characters for these two genera are discussed in the treatment of *Selvitsa*. Superficially, species of *Scoposcartula* are similar to some *Parathona* Melichar.

Tettigonia basimacula Walker as interpreted here is based on males associated with a female compared with the lectotype by the present writer.

The present interpretation of *Tettigonia bilimitata* Signoret rests on the original illustration and on a drawing of the abdominal sternum VII of the female made by the writer. The only specimen of *T. bilunata* Signoret seen was the male lectotype which is illustrated here. There is some similarity between the illustration of the latter and the two female specimens of *Cardioscarta semipunctulata* Melichar seen and those two nominal species may eventually be found to be synonyms.

The male genitalia of the lectotype of *Tettigonia inspergata* Signoret agree with the present illustration. *T. limitata* Signoret is without a lectotype. There are no specimens in the Naturhistorisches Museum in Vienna. Also, no specimens have been seen from French Guiana, which is the type-locality, although approximately 70 specimens from a number of localities have been studied in the course of this work. The species was described from the Germar collection which possibly has been destroyed. There is no doubt that the present interpretation of *limitata* accords with Signoret's because the species is readily recognizable externally.

The genitalia of the male lectotype of *Tettigonia oculata* Signoret have been compared with the illustrations published here. No type material of *T. perrisi* Signoret has been seen. This species is also readily recognizable from the original illustration. The present identification agrees with specimens of *perrisi* determined by Melichar in the Hungarian Natural History Museum.

SPECIES OF *SCOPOSCARTULA*

basimacula (Walker), 1851b:746 (*Tettigonia*). SE. Brazil. New combination.
bilimitata (Signoret), 1855d:770 (*Tettigonia*). SE. Brazil. New combination.
bilunata (Signoret), 1855d:771 (*Tettigonia*). SE. Brazil. New combination.
inspergata (Signoret), 1855d:779 (*Tettigonia*). Bolivia, S. Brazil. New combination.
lancifera, n. sp. SE. Brazil.
limitata (Signoret), 1853b:344 (*Tettigonia*). SE. Brazil, Paraguay, Argentina. New combination.
oculata (Signoret), 1853b:344 (*Tettigonia*). Costa Rica, Panama, Colombia, Venezuela, Br. Guiana, S. Brazil, Paraguay, Argentina, Bolivia. New combination.
perrisi (Signoret), 1855d:779 (*Tettigonia*). S. Brazil, Paraguay. New combination.
semipunctulata (Melichar), 1932a:314 (*Cardioscarta*). SE. Brazil. New combination.

KEY TO SPECIES OF *SCOPOSCARTULA*

1. Length 13 mm or more; forewing with three conspicuous basal round yellow spots ..... *basimacula* (Walker) (fig. 546)
   Length less than 11.5 mm; forewing with numerous much smaller spots or without spots at base 2

2. Anterior dorsum and forewings unmarked castaneous except smoky membrane of latter ..... *lancifera*, n. sp., page 678
   Color not as above 3

3. Forewing with longitudinal dark vittae and without pale maculae
perrisi (Signoret) (fig. 547)
Forewing without longitudinal dark vittae, with numerous pale maculae 4

4. Forewing with maculae not extending as far posteriorly as claval apex 5
Forewing with maculae extending posteriorly to or beyond claval apex 7

5. Head with black marking limited to a transverse stripe at base of crown, pronotum without black markings ..... *limitata* (Signoret) (fig. 548)
Head with black marking more extensive; pronotum heavily marked with black 6

6. Pronotum with black markings continuous
semipunctulata (Melichar) (fig. 549)
Pronotum with black markings interrupted
bilunata (Signoret) (fig. 550)

7. Forewing with a conspicuous larger yellow spot in corium before apex 8
Forewing without such a spot, its markings consisting only of small maculae ..... *inspergata* (Signoret) (fig. 551)

8. Pronotum with an interrupted transverse yellow stripe; forewing with small maculations extending to bases of apical cells
bilimitata (Signoret) (fig. 552)
Pronotum not as above; forewing with small maculations not extending beyond bases of anteapical cells ..... *oculata* (Signoret) (fig. 553)

Scoposcartula lancifera, NEW SPECIES

FIGURE 554

Length 10.4-11.2 mm. Head with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly more than four-tenths to one-half interocular width and from three-tenths to almost four-tenths transocular width, crown without a shallow transverse concavity across ocelli, transclypeal suture distinct, clypellus with contour of its lower portion slightly more nearly horizontal than remainder of profile of face. Thorax with pronotal width approximately equal to transocular width of head, lateral pronotal margins convergent anteriorly, dorsopleural carinae incomplete, posterior margin varying from slightly convex to slightly concave, disk transversely rugose; forewing with membrane including all of apical cells, strongly delimited or not basally, veins elevated and distinct. Male with styles not extending posteriorly as far as apex of connective, each with a conspicuous lateral lobe near base of shank, apex acute; aedeagus with shaft strongly curved dorsad at midlength, with a ventral process arising at midlength, curved more gradually dorsad than shaft, and with its posterior margin erose; paraphysis elongate, lanceolate, without rami, located in median

plane. Female abdominal sternum VII moderately produced and bluntly angular; genital chamber with a large bilobate sclerite; ovipositor with first valvulae each bearing a laterobasal sclerite that is finely scobinate on its anterolateral portion, second valvulae as in *S. limitata* (Signoret) (fig. 548*k*); pygofer as in *S. perrisi* (Signoret) (fig. 547*j*).

Crown, pronotum, scutellum, and forewings to membrane, castaneous, membrane fumose; face, thoracic pleura, and femora concolorous with dorsum; tibiae and tarsi darker.

Holotype male, Santa Catharina, Brazil (NCS). One male and two females, Santa Catharina, Brazil, W. 50, S. 26, 100 m., September, 1929 (A. Maller) (BM). One female, Santa Catharina, Brazil, November, 1945 (A. Maller) (AMNH). Holotype on indefinite loan to USNM.

S. lancifera, n. sp., is close to *S. limitata* (Signoret) in the structure of the male genitalia, but differs in the form of the paraphysis. No other species in the genus is without markings on the anterior dorsum.

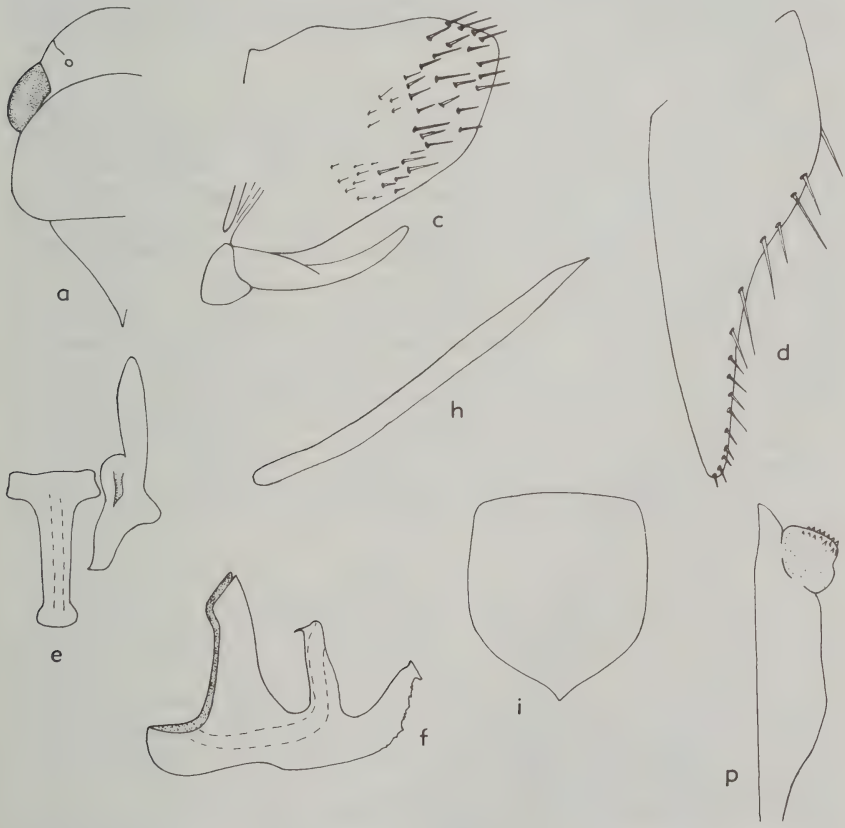


FIGURE 554.—*Scoposcartula lancifera,* n. sp. (from specimens from Santa Catharina, Brazil; *h* from lateral view): *p,* Base of left first valvula from ventral view.

89. SCHILDOLA, NEW GENUS

FIGURES 555-559

Type-species: *Schildola opaca,* n. sp.

Length of male 7.6-8.7 mm, of female 7.6-10.7 mm.

Head weakly produced, with median length of crown of male varying from slightly less than four-tenths to seven-tenths interocular width and from slightly more than one-fifth to slightly less than one-half transocular width, anterior margin very broadly rounded in dorsal view, not angulate or carinate at transition from crown to face, ocelli located before a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle or slightly closer to latter, surface convex or concave, with or without a median fovea, usually glabrous (pitted in *Schildola corrugis,* n. sp. and *S. morio* (Melichar)), lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges protuberant (*S. ductilis,* n. sp.) or not, their anterior margins vertical and slightly concave in lateral view, face convex or slightly flattened in profile, clypeus shining, granular or smooth, lower portion of clypellus continuing contour of remainder of face, transclypeal suture complete or not.

Pronotum with width greater than transocular width of head, lateral margins strongly convergent anteriorly, dorsopleural carinae complete, posterior margin slightly concave; surface from very weakly transversely rugulose to strongly rugose, without pubescence, scutellum with weak reticulate rugae (exception: *corrugis* which is strongly rugose). Forewing with apical membrane variable, veins varying from obscure to elevated and distinct, with four apical cells of which the base of the fourth is located more proximally than base of third, with supernumerary crossveins forming extra anteapical cells in some specimens, otherwise with three closed anteapical cells of which bases are located variably in relation to claval apex, texture coriaceous, wings of female in rest position exceeding apex of ovipositor. Hindleg at rest with knee not attaining posterior proepimeral margin, with femoral setal formula variable (2:1:1; 2:0:0; or 2:several:several), first tarsomere with length variable in relation to combined length of two more distal tarsomeres and with setae of plantar surface arranged in two parallel rows or not.

Male pygofer short or moderately produced, apical margin broadly or narrowly convex, setae few to many, their location variable interspecifically, pygofer processes absent. Plates short, triangular, not extending posteriorly as far as pygofer apex, with setal location varying interspecifically. Style extending posteriorly beyond apex of connective, with preapical lobe, apex varying interspecifically. Connective short, narrowly Y-shaped. Aedeagus slightly decurved, variable interspecifically from short to elongate, without processes. Paraphyses biramous, symmetrical or not.

Female (based on *S. opaca,* n. sp.) abdominal sternum VII with posterior margin transverse and undulate. Genital chamber with a pair of small transverse sclerites. Ovipositor with second valvulae broadened throughout portion beyond basal curvature, teeth as described above for *Oragua* Melichar. Pygofer

broadly rounded apically, with a narrow band of macrosetae parallel to and near posterior margin.

The range of *Schildola* is Costa Rica and Colombia to Bolivia. The genus belongs to the *Oragua* Melichar group of genera, discussed in the treatment of the latter genus. Within that group, the combination of the pronotum being wider than the head, and the ocelli not being located behind a line between the anterior eye angles will separate *Schildola* from the other genera. I have studied the holotype (fig. 559) of *Microgoniella* (*Microscita*) *morio* Melichar in MMB; the genital structures not illustrated are like figure 558.

Schildola, new genus, is named in honor of Pablo Schild, whose collecting activities have contributed much to our knowledge of leafhoppers.

SPECIES OF *SCHILDOLA*

abrupta, n. sp. Ecuador.
corrugis, n. sp. Peru.
ductilis, n. sp. Peru.
morio (Melichar), 1951a:111 (*Microgoniella* (*Microscita*)). Peru. New combination.
opaca, n. sp. Costa Rica, Panama, Colombia.

KEY TO MALES OF *SCHILDOLA*

1. Crown glabrous with sculpturing weak or absent 3
   Crown coarsely punctate 2

2. Paraphyses without processes at their bases (fig. 559)
   morio (Melichar) (fig. 559)
   Paraphyses with processes at their bases (fig. 558*h*)
   corrugis, n. sp., page 685

3. Color dark reddish-brown with orange spots; aedeagus with shaft longer than dorsal apodemes (fig. 555*f*) ..... *opaca*, n. sp.
   Color black with spots ivory to white; aedeagal shaft not longer than dorsal apodemes 4

4. Style apices truncate; paraphyses asymmetrical
   abrupta, n. sp., page 683
   Style apices acute or nearly so; paraphyses symmetrical
   ductilis, n. sp., page 683

Schildola opaca, NEW SPECIES

FIGURE 555, PAGE 682

Length of male 8.4-8.7 mm, of female 7.6-8.0 mm. Head with median length of crown from slightly less than four-tenths to one-half interocular width and from slightly more than one-fifth to three-tenths transocular width, surface convex, glabrous; antennal ledges not protuberant; clypeus slightly flattened medially, obscurely and sparsely punctate. Pronotum weakly rugulose; forewing with veins elevated and distinct. Male pygofer moderately produced, with a dorsal obtuse angle and with apical margin narrowly convex, setae few, located posterodorsally; plates with the larger macrosetae in a

single row; style oblique at apex; aedeagus more slender and elongate than in other species of the genus, only slightly decurved; paraphyses symmetrical, S-shaped in lateral view with the rami directed posteroventrally. Female as in generic description.

Head, pronotum, and scutellum shining dark reddish brown, pronotum with or without a pair of small widely separated orange discal spots; forewings black with six orange to yellow spots in a hexagonal pattern in their basal halves, and a similarly colored slender much larger transverse spot on

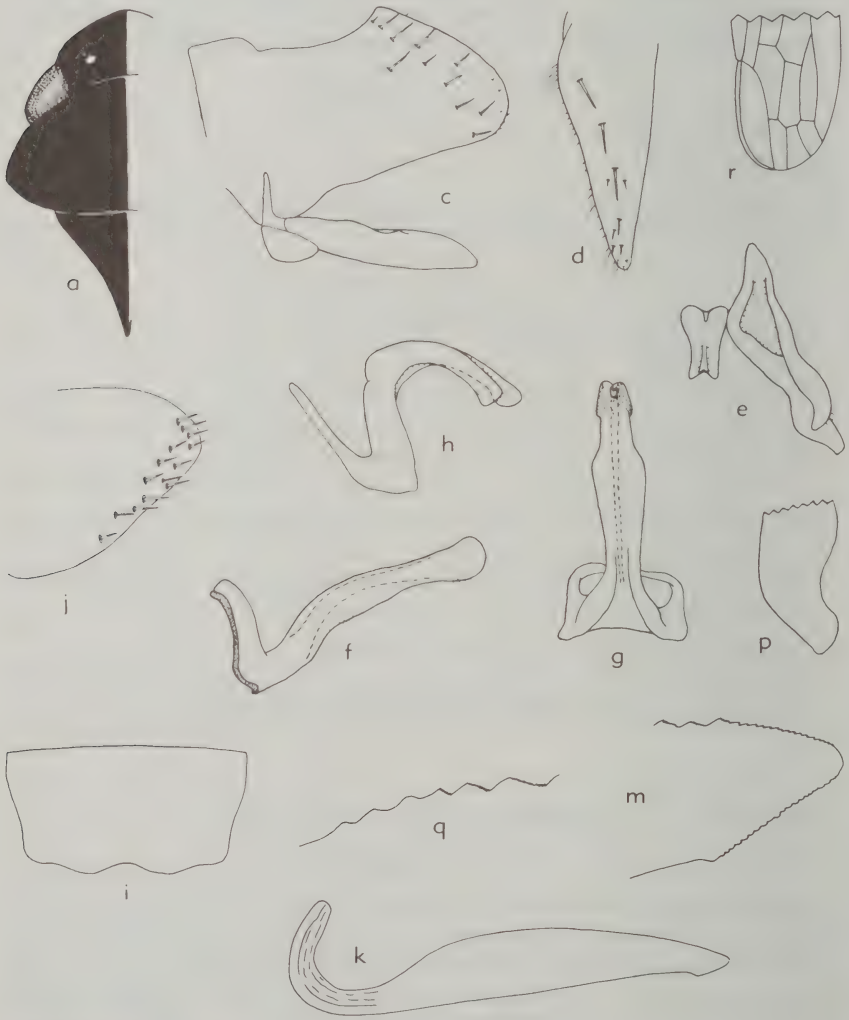


FIGURE 555.—*Schildola opaca*, n. sp. (*i-k*, *m*, *q*, *r*, from topotype; remainder from holotype; *h* from lateral view): *p*, Style apex from lateral view; *q*, basalmost teeth of second valvula; *r*, apex of forewing.

each corium opposite claval apex; face and propleura concolorous with crown, otherwise with venter and legs dark brown with paler sutures and leg joints.

Holotype male and three females and one specimen without abdomen, Tucurrique, Costa Rica (Schild and Burgdorf); one male, Cerro Campana, Panama Province, Panama, September 19, 1951 (F. S. Blanton) (USNM). One pair *in copula* and one specimen with apex of abdomen missing, Suiza, Turrialba, Costa Rica (P. Schild) (OSU). One male and one female, Bogotá, Colombia (Lindig) (RMS).

S. opaca, n. sp., is similar to *S. abrupta,* n. sp. (below), in the discussion of which distinguishing characters are treated.

Schildola abrupta, NEW SPECIES

FIGURE 556, PAGE 684

Length of male 7.6 mm. Head with median length of crown slightly more than one-half interocular width and three-tenths transocular width; antennal ledges slightly protuberant; clypeus weakly punctate, other head characters as in *S. opaca,* n. sp. Pronotum and forewings as in *opaca.* Male pygofer weakly produced, without a dorsal angle, apical margin broadly convex, macrosetae numerous, located on posterior two-thirds of disk; plates with multiseriate macrosetae; style apex truncate; aedeagus shorter and slightly more decurved than in *opaca;* paraphyses essentially symmetrical (but may appear asymmetrical because rami extend at different angles), the rami curved, broadened apically and obliquely truncate. Female unknown.

Head, pronotum, and scutellum shining black with a median quadrate yellow spot at apex of crown; forewings dark with a larger spot on corium bordering claval suture in its basal half, a minute spot near commissural margin in apical half of clavus and an interrupted oblique line on corium touching base of outer anteapical cell, ivory; face, propleura, and legs, black to dark brown.

Holotype male, Baños, Ecuador, 2300 meters, May 28, 1939 (W. Clark-Macintyre) on indefinite loan to USNM from NCS.

S. abrupta, n. sp., is similar to *S. opaca,* n. sp., above, but differs in the form of the male pygofer, the aedeagus and in the rami of the paraphyses, as well as in the setal arrangement of both pygofer and male plates.

Schildola ductilis, NEW SPECIES

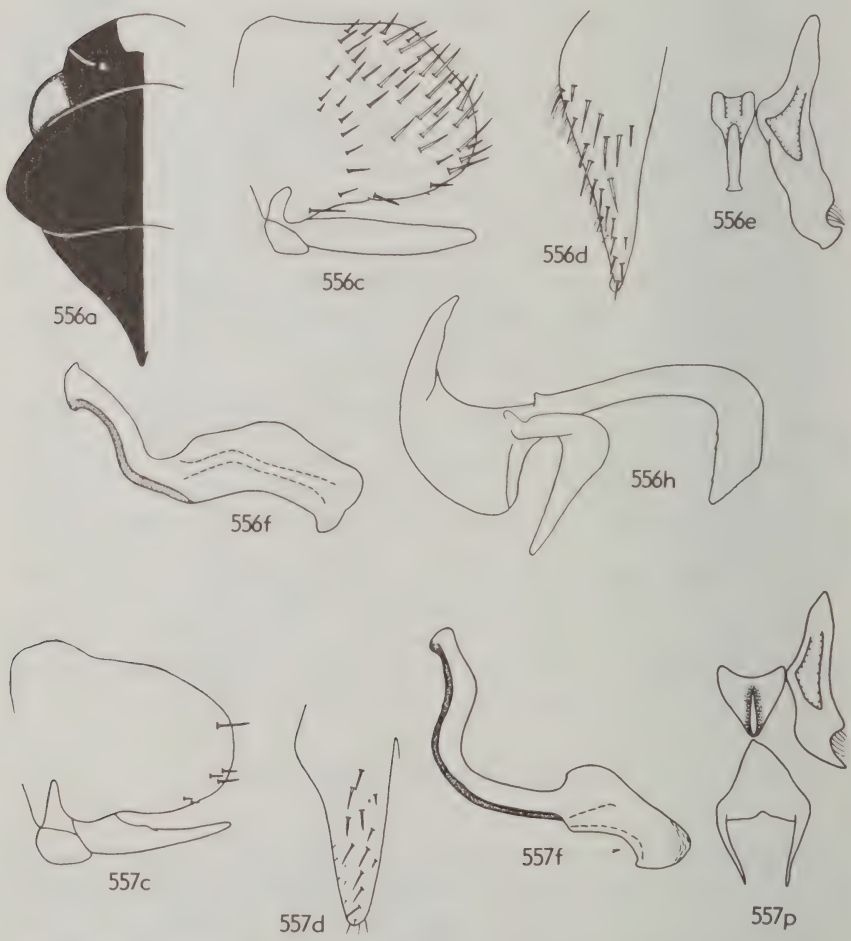
FIGURE 557, PAGE 684

Length of male 7.6-8.4 mm. Head with median length of crown varying from slightly less than one-half to slightly more than one-half interocular width and from three-tenths to almost four-tenths transocular width; antennal ledges slightly protuberant; clypeus not flattened medially, texture coarsely granular; other head characters as in *S. opaca,* n. sp. Pronotum as in *opaca;* forewings with veins less distinct than in *opaca.* Male pygofer weakly produced, without a dorsal angle, apical margin subtruncate, macrosetae few,

located near apical margin; plates and aedeagus much as in *S. abrupta,* n. sp. (above); style apex acute; paraphyses symmetrical, with rami more slender apically than in *abrupta*. Female unknown.

Dorsum shining black with a yellow mark at apex of crown as large as in *abrupta* or smaller (type), forewings with or without (type) a transverse lobate pale spot across bases of anteapical cells; face and propleura black, legs brown.

Holotype male, Santa Isabel, Dept. Cuzco, Peru, November 20, 1961 (F. Woytkowski), and one additional male, Chanchamayo, Peru, July 25, 1960 (Young and Salazar) (NCS). Holotype on indefinite loan to USNM.



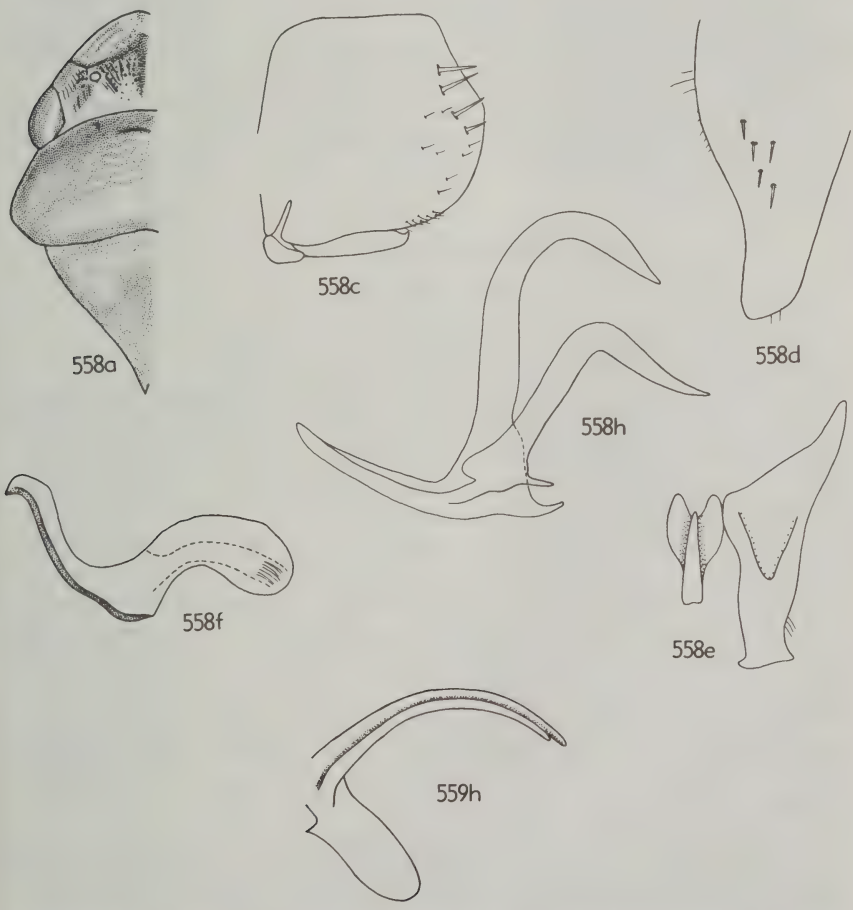
FIGURES 556, 557.—556, *Schildola abrupta,* n. sp., holotype (*h* from lateral view). 557, *S. ductilis,* n. sp., holotype: *p,* Style, connective, and paraphyses, from dorsal view.

S. ductilis, n. sp., is closely related to *S. abrupta,* but is readily separated by the narrower style apices and the narrower apices of the rami of the paraphyses of the male.

Schildola corrugis, NEW SPECIES

FIGURE 558

Length of male 7.3 mm. Head more strongly produced than in other species of the genus, anterior margin almost obtusely angular, median length of crown approximately seven-tenths interocular width and slightly less than one-half transocular width, ocelli slightly closer to adjacent anterior eye angle than to median line of crown, crown concave medially and with a median



FIGURES 558, 559.—558, *Schildola corrugis,* n. sp., holotype (*h* from lateral view). 559, *S. morio* (Melichar), holotype (*h* from lateral view).

fovea in its basal portion, the concave area and a small area laterad of each ocellus coarsely punctate, antennal ledges not protuberant; face convex, clypeus coarsely granular, transclypeal suture obscure. Pronotum strongly transversely rugose; forewing with veins elevated and distinct. Male pygofer very short, without a dorsal angle, with apical margin broadly convex, macrosetae few, located near posterior margin; plates truncate apically, each with a few small setae arranged irregularly on disk; style apex broadly truncate; paraphyses with rami symmetrical, gradually tapering and acute at apex, each with a short process at its base. Female unknown.

Crown and pronotum fuscous with irregular dull yellow spots on disk of crown, muscle impressions on crown dull yellow, their dorsal limit bordered with black, pronotum with irregular black markings along anterior marginal area; scutellum black; forewings dark brown with a pale spot on corium touching claval suture near its midlength and a number of minute pale spots more distally on clavus and corium; face black except yellow muscle impressions; propleura black; legs pale brown except femora which are darker.

Holotype male, Satipo, Peru, November 11, 1942 (AMNH).

S. corrugis, n. sp., differs from all other species in the genus except *S. morio* (Melichar) in the sculpturing of the crown and the concavity on its disk. It may be separated from *morio* by the character used in the key.

90. JAKRAMA, NEW GENUS

FIGURES 560-564

Type-species: *Tettigonia servillei* Signoret.

Length of male 10.9-15.5 mm, of female 11.0-14.9 mm.

Head scarcely produced, median length of crown from one-third to one-half interocular width and from one-fourth to one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each much closer to adjacent anterior eye angle than to median line, crown with a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges in lateral view with anterior margins obliquely convex, not carinate dorsally; clypeus flattened medially, muscle impressions distinct, without pubescence, transclypeal suture entire, clypellus with lower portion not curved abruptly posteriorly.

Thorax with pronotal width less than transocular width of head, lateral margins divergent anteriorly, dorsopleural carinae complete, posterior margin convex or concave, disk with or without transverse rugae, not pubescent; scutellum usually without transverse striae behind transverse sulcus. Forewing with a membrane, veins usually indistinct, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and punctate or without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of

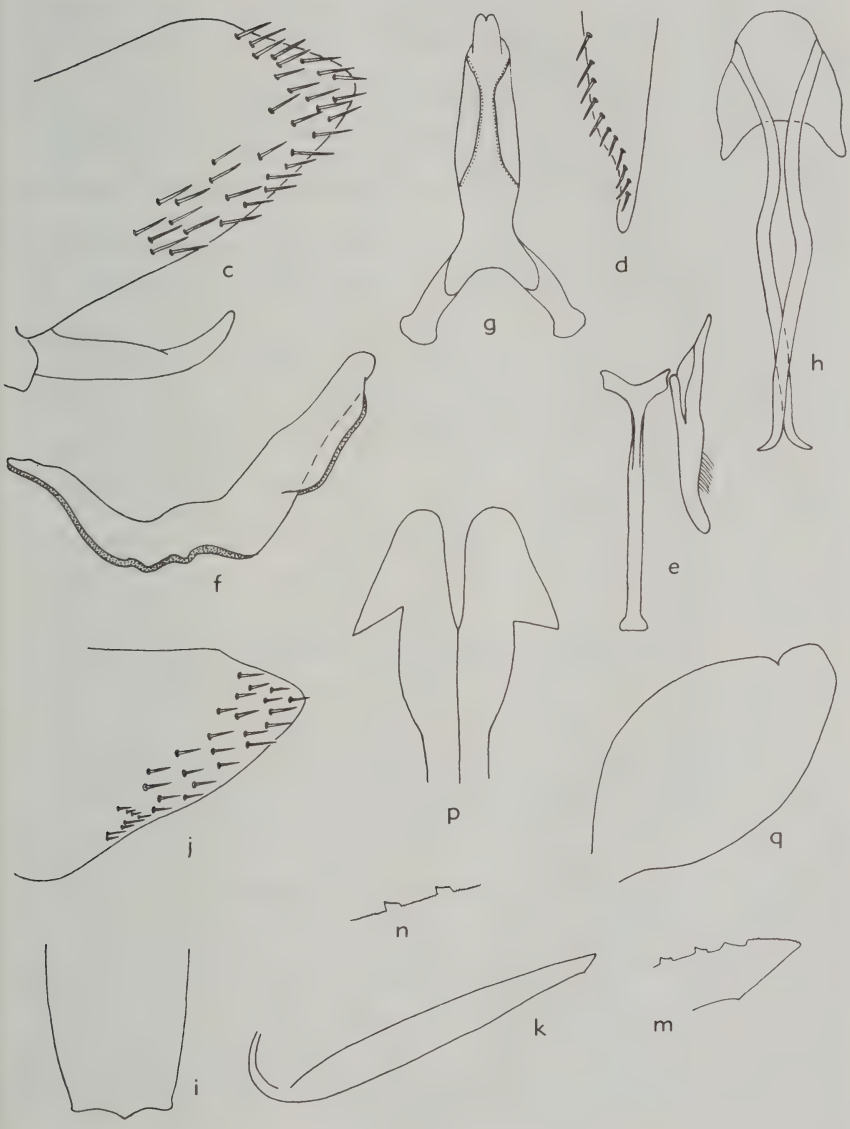


FIGURE 560.—*Jakrama servillei* (Signoret) (*c-g*, from specimen from Purús River, Amazonas; remainder from specimen from French Guiana; *h* from ventral view): *p*, Bases of first valvulae from ventral view; *q*, first valvifer from lateral view.

more distal tarsomeres, and with two longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer well produced, posterodorsal margin narrowly rounded, macrosetae not extremely numerous, arranged in diagonal group. Plates triangular, not extending as far posteriorly as pygofer apex, with uniseriate macrosetae and with microsetae. Style not extending posteriorly nearly as far as apex of connective, with or without preapical lobe. Connective very elongate Y-shaped, with stem much longer than arms. Aedeagus symmetrical, slender, extending posterodorsally, not strongly curved. Paraphyses paired, symmetrical.

Female abdominal sternum VII with a median angulate or small convex projection on posterior margin. Genital chamber with or without sclerites. Ovipositor with second valvulae variable interspecifically, each with the toothed portion occurring through all or apical two-thirds of dorsal margin beyond basal curvature, apex acute or rounded, primary teeth quadrate and with secondaries, apicoventral margin with very fine denticulations. Pygofer greatly resembling that of male in lateral view, and with similar setal pattern.

Jakrama, new genus, ranges from British Guiana, Venezuela, and Colombia southward and southwestward to Bolivia and northeastern Brazil. The genus appears to be related to *Oragua* Melichar and *Tubiga*, new genus.

The type-species, *Tettigonia servillei* Signoret, is without a type-specimen. The present identification of this species is based on a comparison of specimens with the original illustration. There are two specimens of this species in the Signoret collection in Vienna, one of which has the abdomen missing, the other a female, neither eligible as lectotype. The species is more robust than in Signoret's illustration. It contains several distinct color varieties, one as in the original illustration. A second variety from French Guiana is also similar to the original illustration but with a pronotal posterior submarginal black marking adjoining the black marking of the scutellum. A third variety known only from a single male from Bolivia has the anterior pale portion of the forewings at rest occupying almost the whole of the forewings before the transcommissural black marking which occurs near the claval apex. In a fourth variety, from Tingo María, Peru, the forewings are black with a narrow transcommissural pale marking just before midlength and with the apical portion conspicuously membranous. A fifth variety of which specimens have been examined only from Bolivia, all of them somewhat teneral, has red forewings with a pair of humeral pale spots near the scutellum and a narrow transcommissural pale marking close behind this and with the wing apices pale. These color varieties appear as distinct as many species, but no morphological differences have been found to separate them. Both male and female genitalia are similar in all of the specimens studied.

SPECIES OF *JAKRAMA*

eureta, n. sp. Peru.
krameri, n. sp. B. Guiana, Venezuela, NE. Brazil, Peru.
riparia, n. sp. NE. Brazil, Peru.

servillei (Signoret), 1853b:330 (*Tettigonia*) (new name). B. Guiana, NE. Brazil, Colombia, Ecuador, Peru, Bolivia. New combination.

trifasciata (Amyot and Serville), 1843a:570 (*Tettigonia*) (preoccupied).

taeniata, n. sp. NE. Brazil, Ecuador, Bolivia.

KEY TO SPECIES OF *JAKRAMA*

1. Head unicolorous yellow or orange 2
   Head black or marked with black 3
2. Female abdominal sternum VII with posterior margin strongly produced; ovipositor with second valvulae blunt apically ..... *riparia*, n. sp.
   Female abdominal sternum VII with posterior margin only very slightly produced; ovipositor with second valvulae acute apically *servillei* (Signoret) (fig. 560)
3. Forewing with alternating black and white transverse stripes *taeniata*, n. sp., page 693
   Forewing with transverse black stripes on gray background 4
4. Forewings each with a black spot at fork of vein R; male with styles expanded apically ..... *krameri*, n. sp., page 691
   Forewings without such a spot; male with styles not expanded apically *eureta*, n. sp., page 691

Jakrama riparia, NEW SPECIES

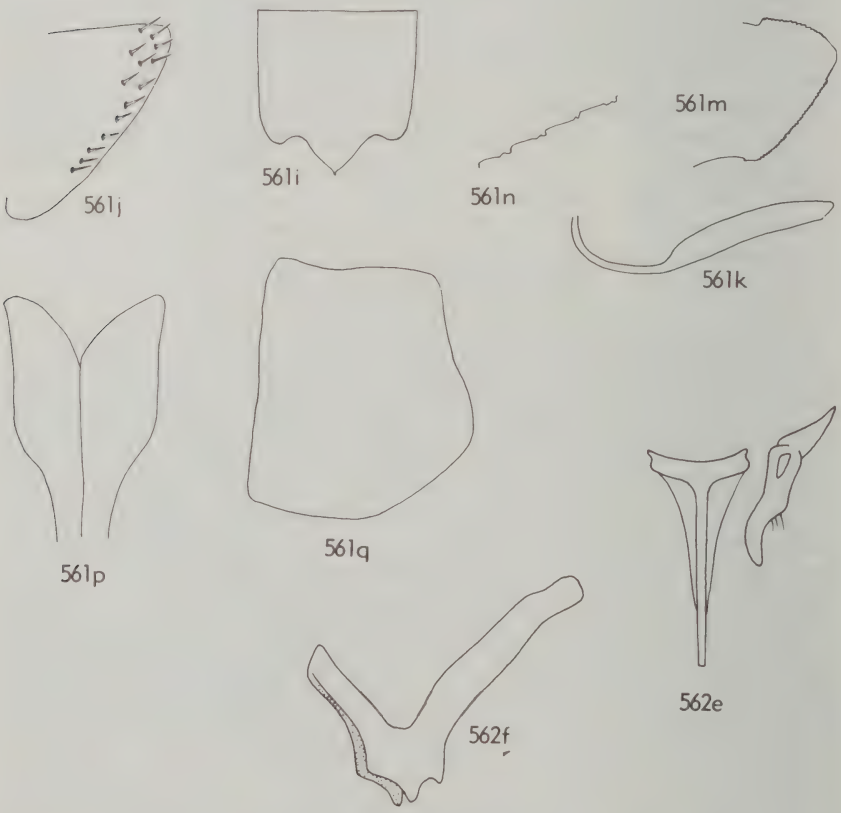
FIGURE 561, PAGE 690

Length of male 13.8 mm, of female 13.0 mm. Head with median length of crown from slightly less than one-third to less than four-tenths interocular width and from slightly more than one-fifth to slightly more than one-fourth transocular width. Pronotum with posterior margin varying from very slightly concave (type) to very slightly convex, disk not (type) or only slightly transversely rugose; scutellum without striae behind transverse sulcus; forewing with membrane not sharply delimited, at least first and second apical cells membranous, veins not very distinct. Male style without a preapical lobe; aedeagus with a pair of lateral flanges extending ventrally. Female abdominal sternum VII with posterior margin broadly triangularly produced posteriorly, the apex acute; genital chamber with a pair of small sclerites near bases of first valvulae; ovipositor with second valvulae broadened and with dorsal margins dentate in apical two-thirds, each with apex blunt. Other structural characters as in generic description.

Color of crown, pronotum, and scutellum coppery (type) or sordid yellow, the scutellum tinged with purple; forewings black, in rest position with a transcommissural broad stripe across midclavus and a similar stripe at claval apex, the latter stripe broader towards costal margin, bright yellow (type) or sordid yellow; face coppery (type), to sordid brown with a median paler stripe; propleura yellow (obscured by pruinosity in type).

Holotype female, Río Santiago, Peru, September 23, 1924, H. Bassler collection, Accession No. 33591; two males from Manáos and Olivenca, Amazonas, Brazil, October 1945 and July 1932 respectively (AMNH). One male, Rio Negro, Brazil (CAS).

If I have correctly associated the sexes, the male genitalia of *J. riparia,* n. sp., are identical to those of *J. servillei* (Signoret). The new species differs from the latter in that the abdominal sternum VII of the female is more broadly produced posteriorly, in that the toothed portion of its second valvulae is much less extensive (it occupies almost the whole length of the valvulae beyond the basal curvature in *servillei*), in its blunt apex of the second valvula (acute in *servillei*), in its separate sclerites in the genital chamber of the female (absent in *servillei*) and in the diagonally truncate bases of the first valvulae in ventral view (more produced and rounded in *servillei*).



FIGURES 561, 562.—561, *Jakrama riparia*, n. sp., holotype; *p*, Bases of first valvulae from ventral view; *q*, first valvifer from lateral view. 562, *J. eureta*, n. sp., holotype.

Jakrama eureta, NEW SPECIES

FIGURE 562, PAGE 690

Length of male 11.9-12.0 mm, female unknown. Head with median length of crown four-tenths interocular width and slightly more than one-fourth transocular width. Pronotum with posterior margin varying from rectilinear (type) to very slightly convex, disk not transversely rugose; forewing with membrane including first and second apical cells and apical portions of third and fourth apical cells. Male without lateral flanges on aedeagus. Other structural characters of male as in *J. riparia,* n. sp.

Color of anterior half of crown yellow, marked with black medially, posterior half of crown and all of pronotum and scutellum with ground color dull ivory with numerous black markings, the major ones being an angular spot next the inner margin of each eye, a marking surrounding each ocellus, an arcuate marking on each side of disk of pronotum, a pair of spots on anterior margin, and transverse sulcus of scutellum; forewing dull gray with a narrow transverse marking across humerus near base, a narrow transcommissural stripe interrupted by scutellar apex, a narrow transcommissural stripe at apical half of clavus, a transcommissural stripe at claval apex and a transverse stripe before bases of apical cells, black, membrane fumose with an oval white spot on bases of third and fourth apical cells; face brown with minute yellow spots and irrorations; pleura yellow; legs yellow with anterior and middle tarsi and apex of posterior tarsi, black.

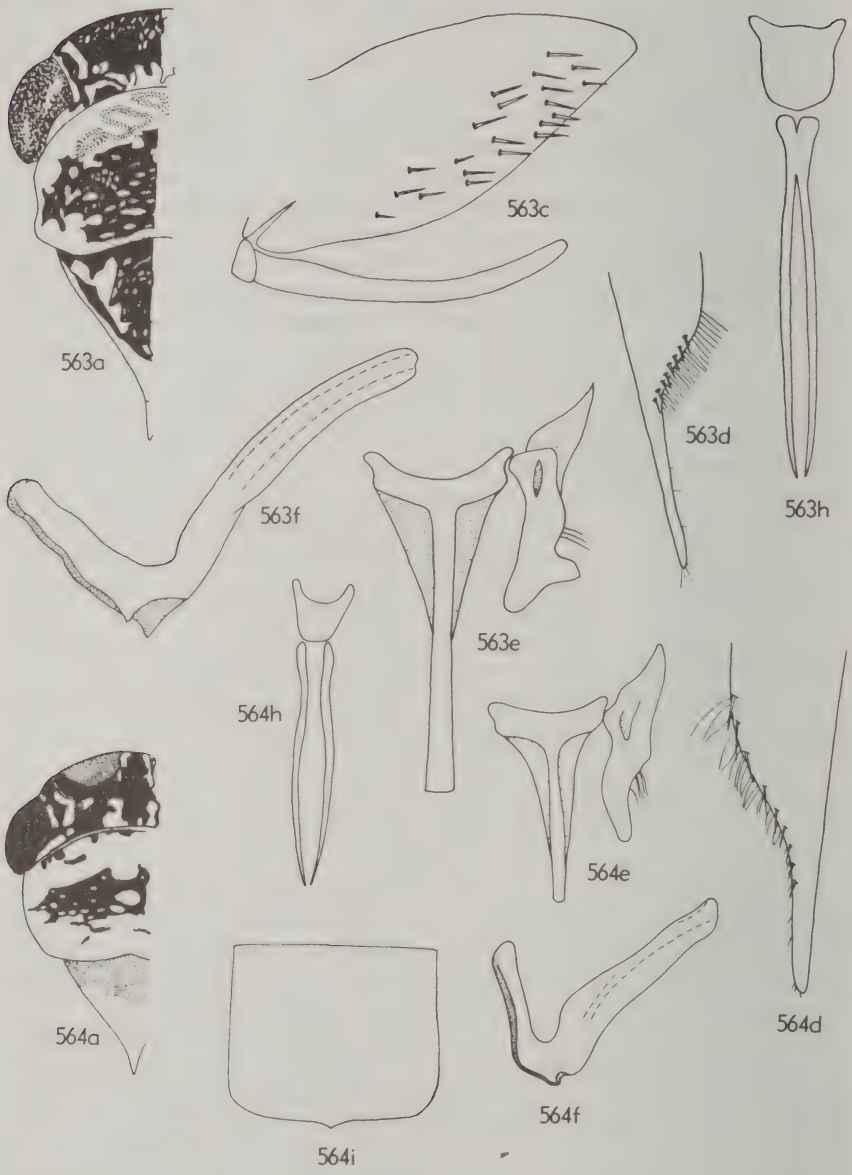
Holotype male, Callanga, Peru (RMS). One additional male, Tingo María, Huánuco, Peru, October 21, 1946, elevation 2200 ft. (AMNH).

J. eureta, n. sp., is closely related to *J. taeniata,* n. sp. (below), in the treatment of which distinguishing characters are discussed.

Jakrama krameri, NEW SPECIES

FIGURE 563, PAGE 692

Length of male 12.5-12.7 mm, of female 13.7 mm. Head with median length of crown from slightly more than four-tenths to one-half interocular width and from slightly more than one-fourth to slightly less than one-third transocular width. Pronotum with posterior margin very slightly concave, disk not transversely rugose; scutellum without striae behind transverse sulcus; forewing with membrane sharply delimited, including all four apical cells and extending slightly forward along costal margin, veins very distinct. Male style broadened and bilobed apically, the mesal lobe rounded, the lateral lobe subacute at apex; aedeagus smoothly curved dorsally and posteriorly, in lateral view with its dorsal margin regularly convex. Female abdominal sternum VII much as in illustration of *J. taeniata,* n. sp. (fig. 564*i*), but with a slight median posterior convexity instead of an angle; genital chamber without a pair of small sclerites near bases of first valvulae, which are strongly convex at their bases; ovipositor with second valvulae broadened and with dorsal margins dentate almost throughout their length, each with apex acute. Other structural characters as in generic description.



FIGURES 563, 564.—563, *Jakrama krameri*, n. sp., holotype (*h* from dorsal view). 564, *J. taeniata*, n. sp., (*i* from specimen from Teffé, upper Amazon; remainder from holotype; *h* from dorsal view).

Color of crown, pronotum, and scutellum dark with many yellow vermiculations; forewing dull blue with an arc subtending wing base, a spot in corium next costal margin opposite midclavus, a transverse transcommissural narrow stripe across apical half of clavus and adjacent corium, a diagonal stripe across bases of anteapical cells, and an arc at apices of apical cells, black, apex of membrane narrowly fumose; clypeus and basal portion of clypellus black to brown, irrorate with yellow; remainder of face, thoracic pleura and legs, yellow, the last marked with black apically.

Holotype and one additional male, Mt. Duida, Venezuela, November 4, 1928, one female, Suapure, El Caura, Venezuela, March, 1899 (M. Wirtner) (AMNH). One specimen without abdomen, N. W. District, British Guiana, Wanaina, March, 1931 (J. G. Myers) (BM). One pair, Olivenca and Fontebõa, Upper Amazon (RMS). One male, San Antonio, Loreto, Peru, August 22, 1952 (J. C. Hitchcock, Jr.) (USNM).

J. krameri, n. sp., is similar to *J. eureta,* n. sp., in external appearance but differs in the presence of the black corial spot opposite midclavus. The male genitalia of *krameri* differ in the greatly expanded style apex. The species is named in honor of Dr. James P. Kramer of the Systematic Entomology Laboratories, USDA, who has been most helpful in the course of this work.

Jakrama taeniata, NEW SPECIES

FIGURE 564, PAGE 692

Length of male 10.9 mm, of female 11.0-12.3 mm. Head with median length of crown from slightly less than four-tenths to almost one-half interocular width and from one-fourth to almost one-third transocular width. Pronotum with posterior margin very slightly concave, disk not transversely rugose; scutellum without striae behind transverse sulcus; forewing with membrane sharply delimited, including first and second and apical portions of third and fourth apical cells, veins not very distinct. Male style without a preapical lobe; aedeagus without processes, directed posterodorsally, its dorsal margin slightly concave in lateral view. Female abdominal sternum VII with posterior margin transverse except for a slight median angular projection; genital chamber and second valvulae of ovipositor as in *J. krameri,* n. sp. Other structural characters as in generic description.

Crown, pronotum, and scutellum ivory irregularly marked with black, forewing white with a narrow transverse stripe across humerus, a broader transcommissural stripe at scutellar apex, a transcommissural stripe, broader than preceding, extending across wing at midclavus, a similar one at claval apex, and a transverse stripe at bases of apical cells, black; face, thoracic pleura and legs yellow, the clypeus sprinkled with brown.

Holotype male, Bolivia (William M. Mann), Mulford Biological Exploration, 1921-22 and one female, Canelos, Ecuador (USNM). Two males, Olivenca and one female, Teffé, all from Upper Amazon (RMS).

J. taeniata, n. sp., is closely related to *J. eureta,* n. sp., from which it can be distinguished externally by the much broader black stripes and the much whiter background in *taeniata.*

91. TRACHYGONALIA, NEW GENUS

FIGURE 565

Type-species: *Tettigonia germari* Signoret (1853b:359).

Length of male 8.8 mm, of female 8.8-9.1 mm.

Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than four-tenths to slightly more than four-tenths interocular width and from one-fourth to slightly more than one-fourth transocular width, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, surface of crown convex and coarsely and heavily punctate, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and slightly concave; clypeus convex, disk coarsely and densely punctate, muscle impressions distinct, transclypeal suture obsolete, clypellus greatly flattened, its contour not a continuation of profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin shallowly concave, surface coarsely and irregularly rugose; scutellum coarsely transversely rugose on basal two-thirds. Forewing with only inner apical cell membranous; veins not very distinct, with three closed anteapical cells of which all bases are proximal to claval apex, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, with two parallel rows of small setae on plantar surface.

Male pygofer moderately produced, broadly rounded at apex, with a number of macrosetae on posterior two-thirds, pygofer processes absent. Plates narrowly triangular with apices narrowly rounded, extending posteriorly almost as far as pygofer apex, with multiseriate small setae. Style short, narrowly rounded apically, with a preapical lobe, extending posteriorly approximately as far as apex of connective. Connective narrowly T-shaped, fused at its apex with base of paraphyses. Aedeagus extending posterodorsally, broad in ventral view, with a pair of flangelike apical processes; basal apodemes very short. Paraphyses short-stalked, biramous, each ramus broad and with an apical very narrow process.

Female abdominal sternum VII not produced, posterior margin shallowly concave. Ovipositor with second valvula bearing numerous teeth on strongly convex dorsal margin beyond the basal curvature, the primaries triangular near base, rectangular through remainder of valvula and each bearing numerous minute secondary denticles, with denticles on anteapical dorsal and posteroventral margins.

Trachygonalia, new genus, is known only from the type-species, *T. germari* (Signoret) from southern Brazil. Specimens are black with an arcuate transverse pale band across the wings including the scutellar apex and a similar

straight band including claval apex. *Trachygonalia* belongs to the *Oragua* Melichar group of genera, in which it is unique in having the paraphyses fused to the connective. No species other than *T. germari* in the generic group is marked as described above.

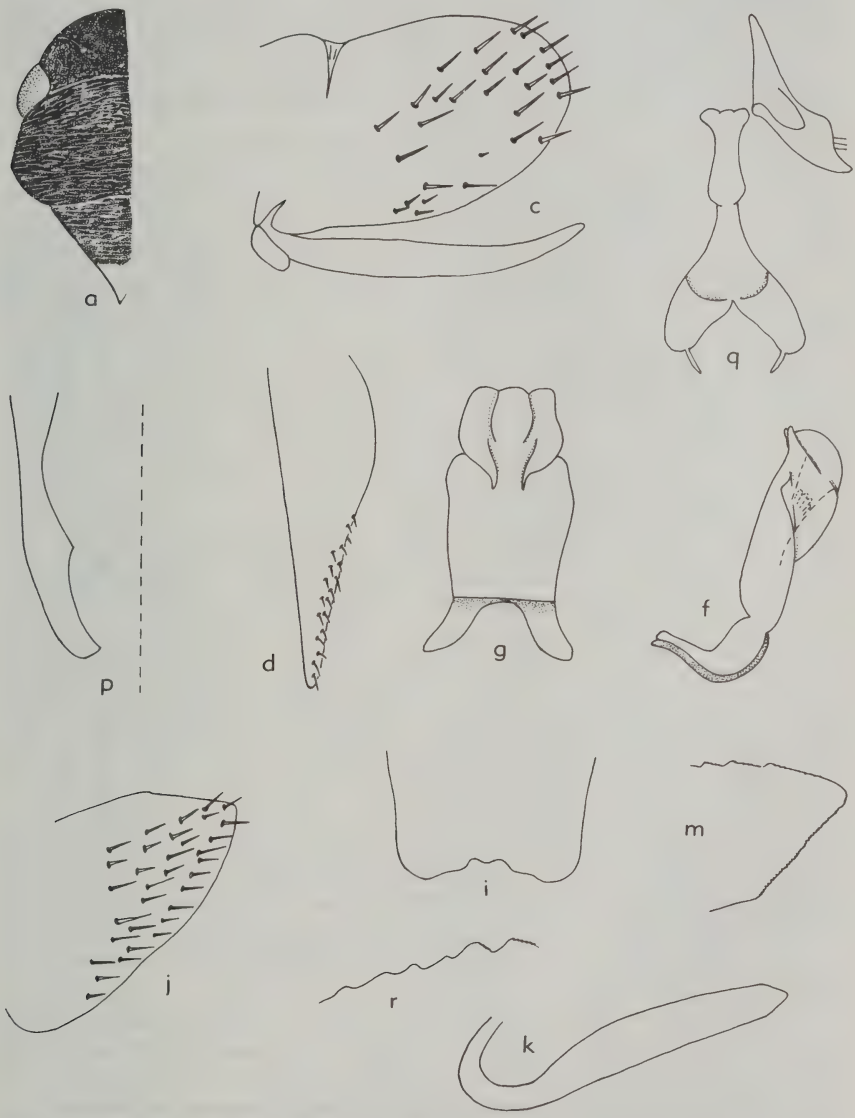


FIGURE 565.—*Trachygonalia germari* (Signoret) (*i-k, m, r,* from specimen from Nova Teutonia, Brazil; remainder from specimens from Espírito Santo, Brazil): *p,* Male pygofer, right side, from ventral view; *q,* style, connective, and paraphyses, from dorsal view; *r* basalmost teeth of second valvula.

92. Genus SIBOVIA China

Figures 566-591

Ceratogonia Melichar, 1926a:350. Type-species: *Tettigonia recta* Fowler, by original designation (preoccupied).

Entogonia Melichar, 1926a:360. Type-species: *Tettigonia sagata* Signoret, by original designation (preoccupied).

Sibovia China, 1927d:283 (new name for *Entogonia* Melichar).

Ceratogoniella Metcalf, 1952a:228 (new name for *Ceratogonia* Melichar). New synonymy.

Length of male 4.5-6.7 mm, of female 5.6-7.2 mm.

Head varying from moderately to well produced, anterior margin broadly rounded in dorsal view, median length of crown greatly variable compared to (from slightly more than one-half, to equal to) interocular width, and varying from one-third to six-tenths transocular width, without a carina at transition from crown to face, ocelli located on or behind (*S. chanchama,* n. sp.) a line between anterior eye angles, each ocellus usually slightly closer to adjacent anterior eye angle than to median line of crown; crown convex, with or without a transverse concavity before ocelli, without a median fovea and usually without sculpturing (punctate in *S. mesolinea* (DeLong and Currie)), without setae, lateral clypeal sutures extending onto crown and attaining ocelli (exception: *S. infula* (Melichar)); antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; face nearly always without a vertical lenticular sclerite bordering lateral clypeal suture on each side, clypeus not or only slightly flattened medially, muscle impressions not very distinct (exception: *mesolinea*), transclypeal suture complete or obsolete at middle, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width equal to, greater, or less than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete, posterior margin usually slightly concave, disk without sculpturing (exception: *mesolinea* which has transverse rugae) or pubescence; scutellum not transversely striate behind transverse sulcus. Forewing with membrane present, varying interspecifically in extent, with three closed anteapical cells, of which the bases of the outer two are slightly more proximal than base of inner anteapical cell, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, apex varying interspecifically from narrowly to broadly rounded (subtruncate in *S. praevia* (Melichar)), with numerous macrosetae on posterior half, the setiferous area extending anteriorly or anteroventrally in some species, pygofer processes not differentially sclerotized when present (exception: *praevia*). Plates slender and triangular, usually not extending as far posteriorly as pygofer apex, with few macrosetae in longitudinal row. Style usually not extending posteriorly nearly as far as apex of connective, truncate apically (exception: *infula*), with preapical lobe

strongly developed. Connective usually with stem much longer than arms. Aedeagus short, without processes or with a pair of short lobate processes near midlength of shaft. Paraphyses present, variable interspecifically.

Female abdominal sternum VII moderately produced, with posterior margin usually truncate or slightly produced medially in a short, rounded lobe. Genital chamber without sclerites. Ovipositor with second valvulae narrow and usually without teeth in basal part (almost one-half, or more) of portion beyond basal curvature (exception: *S. recta* (Fowler)), broadened portion bearing teeth that are large and quadrate near base, progressively smaller

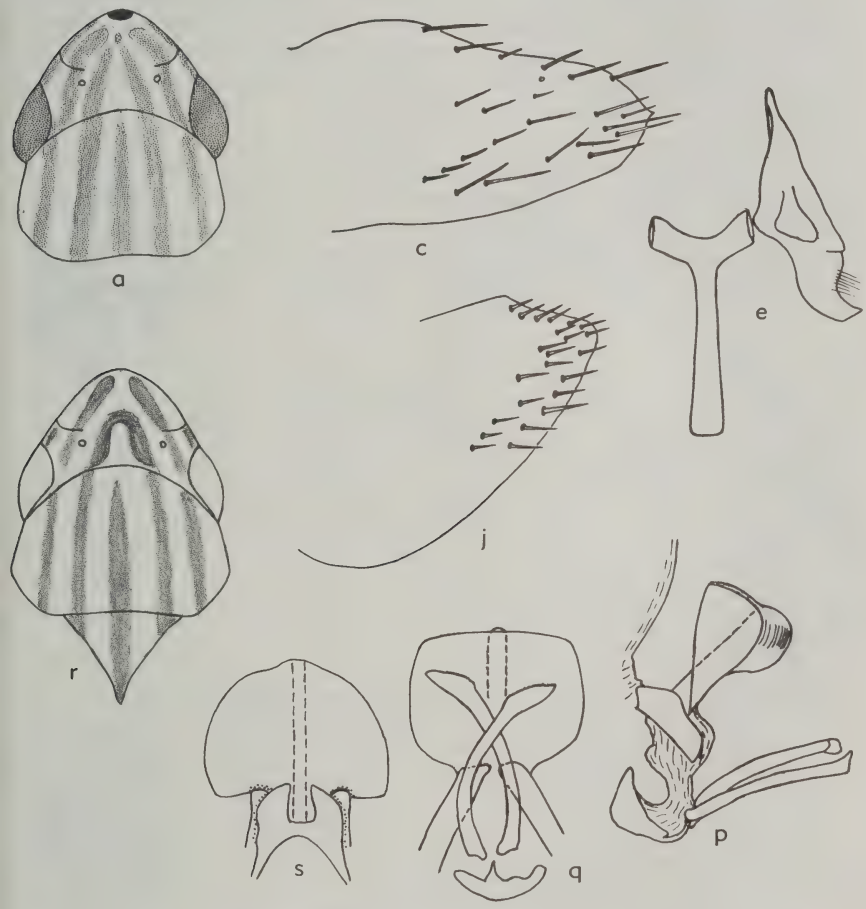
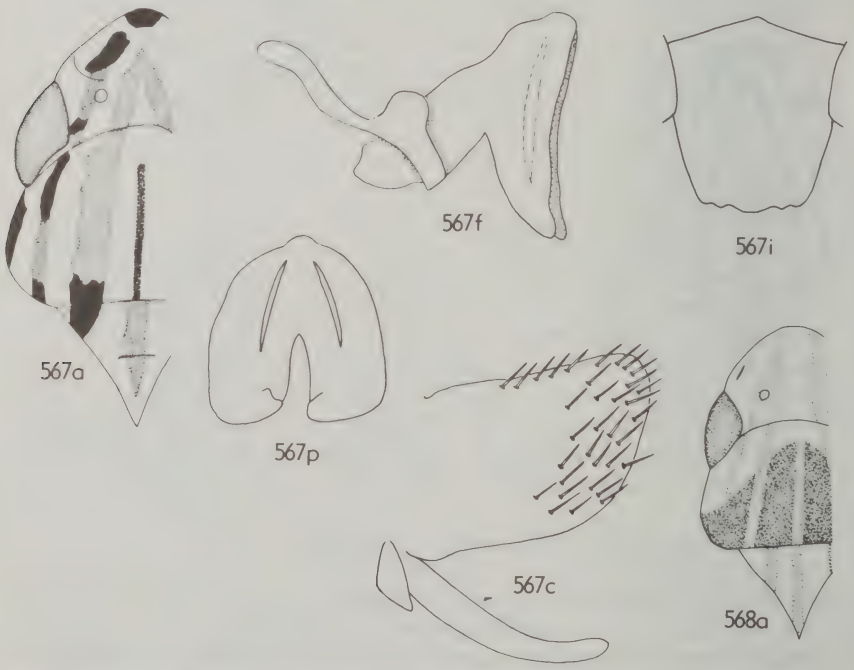


FIGURE 566.—*Sibovia compta* (Fowler) (*a* from specimen from Yepocapa, Guatemala; *c, e, p, q,* from El Salvador; *r, s,* from Tubac, Arizona; *j* from Santa Engracia, Mexico; plate not shown in *c*): *p,* Aedeagus, paraphyses, and portion of anal tube, from lateral view; *q,* aedeagus and paraphyses, from caudoventral view; *r,* anterior dorsum, *s,* aedeagus from caudoventral view.

towards apex (exceptions: *praevia* (Melichar) and *pileata* (Fowler)), the primary teeth bearing minute secondaries, valvular apices acute, with minute anteapical dorsal denticles. Pygofer with a number of macrosetae near dorsal margin and parallel to posteroventral margin.

Specimens of *Sibovia* are mostly green to yellowish with antennae unusually long for the tribe, with paired, usually convergent, black stripes on the crown. Specimens have been studied from localities from southern U.S.A. to southern Brazil and northern Argentina. *Sibovia* is the first genus treated here in the *Erythrogonia* generic group (genera 92-114, see p. 770). Although I have not been able to relate it closely to other genera of the group, it is placed here mainly because of the similarity of the female genital structures to those of some other genera of the group. The male genitalia are similar to those of *Cyclogonia*, in the *Juliaca* generic group but the anterior dorsum is more slender, and the inner anteapical cell is closed basally in *Sibovia*.

I have seen specimens of *S. compta* (Fowler) which were collected on *Eupatorium adenophorum* Sprengel in Cuernavaca, Mexico, and other specimens collected on alfalfa in Puebla, Mexico by R. C. Bechtel and E. I. Schlinger. As stated below, *S. nielsoni*, n. sp., has been collected on *Phaseolus vulgaris* L. in Costa Rica, and in a potato field (Paul H. and George F. Freytag). *S. festana*, n. sp., has been collected on grass, and on legumes in Colombia, and on



FIGURES 567, 568.—567, *Sibovia composita* (Fowler) (*i* from holotype; remainder from Yepocapa, Guatemala): *p*, Aedeagal apex, from caudal view. 568, *S. sororia* (Fowler), from specimen from Cuernavaca, Mexico.

cacao in Ecuador. In company with Juan Salazar and Juan Ramirez, I collected *S. taeniatifrons* (Schmidt) on grasses and on squash in Chanchamayo, Peru. *S. tunicata* (Fowler) was collected on *Lantana camara* L. in Cuernavaca, Mexico by N. L. H. Krauss. There are additional records of *Sibovia occatoria* (Say) having been taken on numerous host plants (Metcalf 1965a:35-38) but these records need to be verified in the light of refinements of our ability to distinguish the species of *Sibovia* from one another and even from other genera.

A male specimen of *Entogonia aprica* Melichar from the Moravian Museum in Brno is here selected as lectotype. It bears labels: "Mapiri/Bolivia" and "aprica m./det. Melichar." and "Typus" and "Collectio/Dr. L. Melichar/Moravske museum Brno" and "Entogonia/aprica/M.". It is conspecific with the lectotype of *Entogonia boliviana* Schmidt. The paraphyses, not

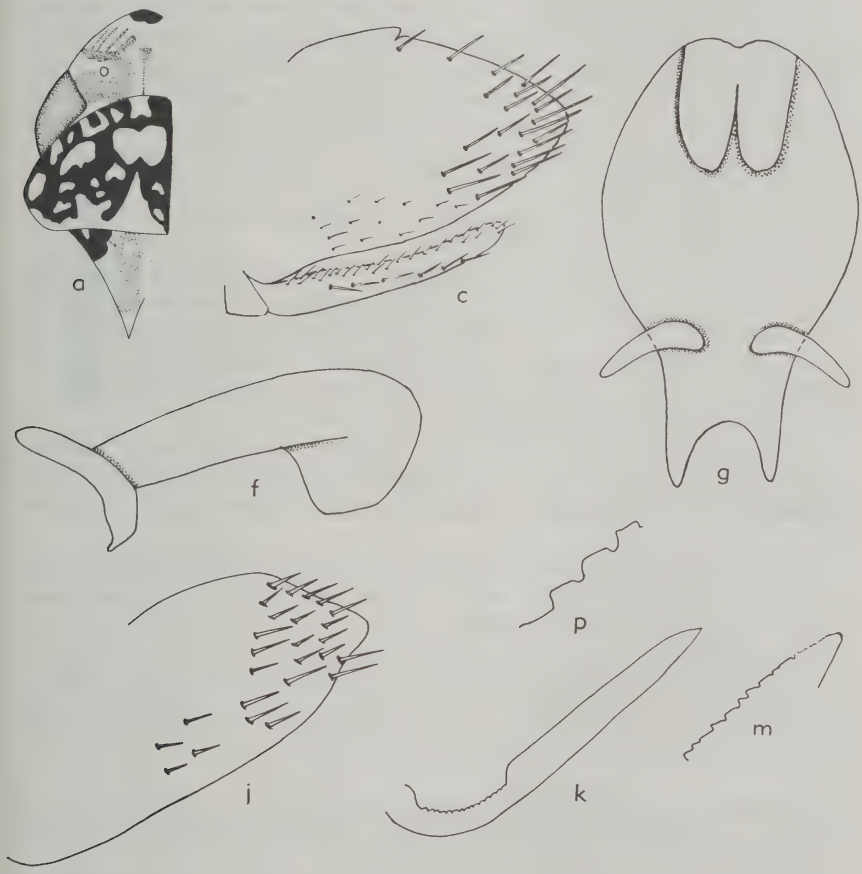


FIGURE 569.—*Sibovia recta* (Fowler) (*a* from specimen from Taxco, Mexico; *j*, *k*, *m*, *p*, from Cuernavaca, Mexico; remainder from Puebla, Mexico): *p*, Basalmost teeth of second valvula.

shown in figure 571, are like those of *S. sagata* (Signoret) (fig. 582*h*) except that the edges are not serrate.

Tettigonia civilis Fowler is identified here on the basis of a study of the lectotype. Its markings are not like those of most of the other species, but the structural characters agree, including the ovipositor. The present interpretation of *Tettigonia compta* Fowler is based on a study of the male lectotype, the genitalia of which are very similar to the specimen illustrated here (fig. 566) from El Salvador. The present interpretation of *T. flaccida* Fowler rests on a comparison of the female lectotype with figure 566*a*. My interpretation of *Entogonia convergens* Melichar is based on a male cotype in ZIMH. This specimen, one of 15 "cotypes" in the collection in Hamburg, is here designated lectotype. The specimen bears labels: "Costa Rica/San Jose 1911-1912" and "H. Schmidt leg./vend. 6.3.1913". The genitalia of this specimen were also very close to those of the specimen from El Salvador illustrated here.

My interpretation of *Entogonia conferta* Melichar is based on a male "cotype" of this species in ZIMH. This specimen is here designated lectotype. It bears labels: "Costa Rica/S. Jose 5.8.1910" and "H. Schmidt leg./vend. 1.11.1910" and "Entogonia/conferta m./L. Melichar det. 1922", and a longhand determination label. A second "cotype" in the Hamburg collection had the head missing. The genitalia of the lectotype are as the specimen illustrated here (fig. 584) from Panama.

I have seen only the holotype of *Entogonia inexpectata* Metcalf and Bruner, a specimen in NCS without abdomen.

I have seen only the holotype of *Neokolla mesolinea* DeLong and Currie (fig. 580). The male genital characters, not illustrated here, are all very similar to the illustrations of *S. recta* (Fowler) (fig. 569) (but the plates extend posteriorly as far as the pygofer apex, and there is no ventral group of microsetae on the pygofer), except the style and connective which are very close to the illustration of *S. conferta* (Melichar) (fig. 584).

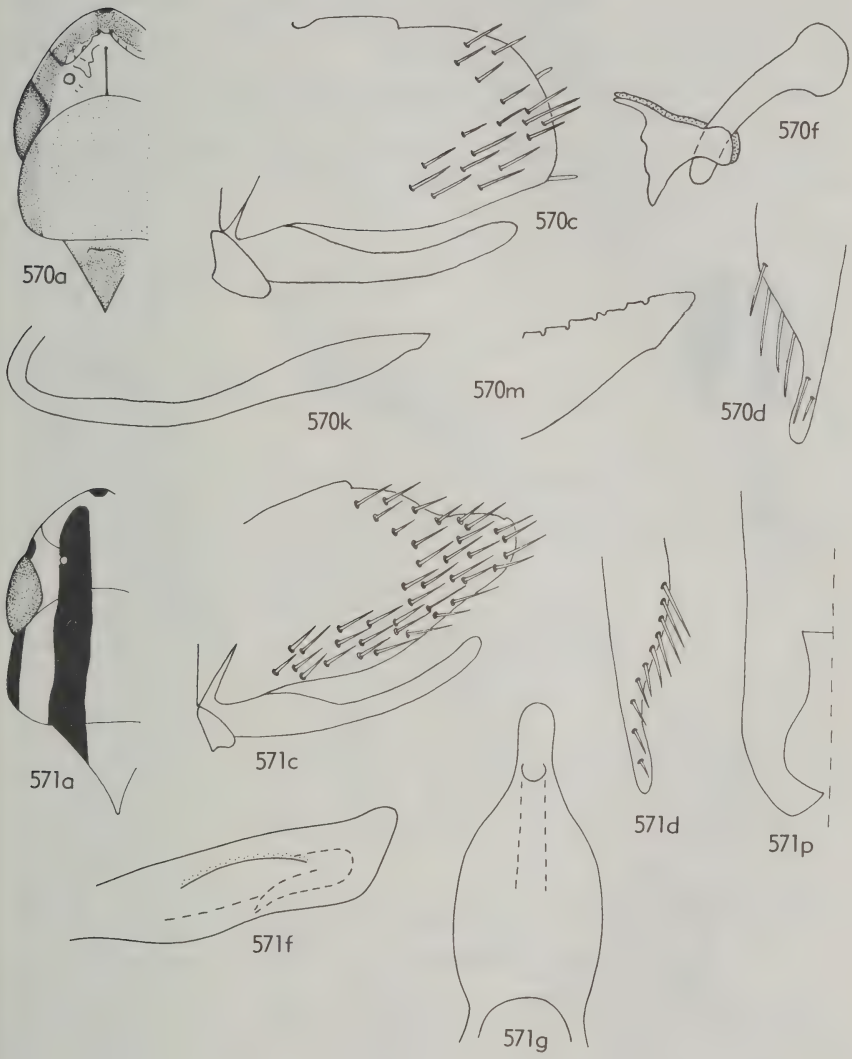
The type material of the Thomas Say collection was destroyed. I have interpreted *Sibovia occatoria* (Say) in the light of specimens from eastern U.S.A. (Indiana was the type-locality). There is only one species known in eastern U.S.A.

I have seen only the female lectotype of *Ceratogonia optabilis* Melichar (fig. 591). It was not at hand when the key was written. The species is near *Sibovia prodigiosa* (Melichar) and *S. chanchama*, n. sp.

Specimens of *S. pileata* (Fowler) have a red-margined crown like specimens of the new genera *Coronigoniella*, *Stephanolla*, and *Coronigonalia*, but the female genitalia are very close to *Sibovia* species (valvulae II very near *S. praevia*, and abdominal VII not produced), and the male genitalia are close to *S. sagata* (Signoret).

A specimen in MMB labeled "typus" from Marcapata, Peru and bearing Melichar's determination label, is the basis of *Sibovia praevia* (Melichar), as treated here.

I have identified *Ceratogonia prodigiosa* Melichar in the sense of the female lectotype and a male labeled "paralectotypus" from MMB.



FIGURES 570, 571.—570, *Sibovia pileata* (Fowler) (*a* from Potrerillos, Panama; *k, m,* from San Isidro del General, Costa Rica; remainder from Concepción, Panama. 571, *S. aprica* (Melichar) (*c, d, p,* from lectotype; remainder from lectotype of *Entogonia boliviana* Schmidt; scutellum distorted in *a*): *p,* Male pygofer, left side, from dorsal view.

Tettigonia aequa Fowler is interpreted here in the sense of the lectotype male which was dissected. The lectotype of *Tettigonia recta* Fowler has also been studied, and is synonymized after a study which included examination of the male genitalia. The style apices differ somewhat in the two type-specimens, but I consider these intraspecific variations.

The type-locality of *Sibovia sagata* (Signoret) is Mexico, but there were no specimens of this species in NMV at the time I visited there. Specimens in MHNP were from localities other than Mexico. I think Signoret's illustration of this species can only apply to specimens which occur in southern Brazil

FIGURE 572.—*Sibovia taeniatifrons* (Schmidt) (*e*, *p*, from specimen from Chanchamayo, Peru; *q*, from Tungurahua, Ecuador; remainder from Ecuador; *h* from ventral view): *p*, Aedeagus and paraphyses, from lateral view; *q*, apical portion of forewing.

and Argentina, and which agree with Melichar's identification of *S. sagata,* and that the original reference to Mexico was an error. Some male specimens of this species have no serrations on the paraphyses.

The lectotype of *Tettigonia sororia* Fowler is without an abdomen. The present interpretation is based on a male compared with the original illustration of *sororia*. The male genitalia, not illustrated here, are very close to the present illustration of *Sibovia recta* (Fowler) (fig. 569), but externally the species appear distinct.

The lectotype female of *Entogonia taeniatifrons* Schmidt agreed with a sketch of the anterior dorsum of the male specimen from Ecuador (fig. 572*a*).

The genitalia of a male specimen which was compared with the female lectotype of *Tettigonia tunicata* Fowler agree well with the specimen from Vera Cruz illustrated here (fig. 586).

SPECIES OF *SIBOVIA*

aprica (Melichar), 1926a:364 (*Entogonia*). Bolivia.
boliviana (Schmidt), 1928c:87 (*Entogonia*). New synonymy.
carahua, n. sp. Peru.
chanchama, n. sp. Peru.
civilis (Fowler), 1900b:272 (*Tettigonia*). Mexico. New combination.
composita (Fowler), 1900c:277 (*Tettigonia*). Mexico, Guatemala.
compta (Fowler), 1900b:271 (*Tettigonia*). Arizona, Mexico, Guatemala, El Salvador, Costa Rica. New combination.
flaccida (Fowler), 1900c:278 (*Tettigonia*). New synonymy.
convergens (Melichar), 1926a:365 (*Entogonia*). New synonymy.
conferta (Melichar), 1926a:365 (*Entogonia*). Costa Rica, Panama.
festana, n. sp. Venezuela, Colombia, Ecuador, Peru.
huasima, n. sp. Peru.
improvisula, n. sp. Mexico.
inexpectata (Metcalf and Bruner), 1936a:967 (*Entogonia*). Cuba. New combination.
infula (Melichar), 1926a:353 (*Ceratogonia*), Colombia. New combination.
mesolinea (DeLong and Currie), 1959a:61 (*Neokolla*). Mexico. New combination.
nielsoni, n. sp. S. Mexico through Panama, West Indies, Venezuela, Ecuador, Bolivia, S. Brazil.
occaminis, n. sp. Mexico.
occatoria (Say), 1830b:311 (*Tettigonia*). Central and S. U.S.A., Mexico, Guatemala, El Salvador, Costa Rica.
optabilis (Melichar), 1926a:352 (*Ceratogonia*). Peru. New combination.
picchitula, n. sp. Peru.
pileata (Fowler), 1900d:287 (*Tettigonia*). Costa Rica, Panama. New combination.
praevia (Melichar), 1926a:362 (*Entogonia*). Peru.
prodigiosa (Melichar), 1926a:351 (*Ceratogonia*). Colombia. New combination.
recta (Fowler), 1900a:264 (*Tettigonia*). Mexico, Costa Rica. New combination.
aequa (Fowler), 1900b:265 (*Tettigonia*). New synonymy.
sagata (Signoret), 1854a:27 (*Tettigonia*). S. Brazil, Argentina, Bolivia.
skeeleae, n. sp., Costa Rica, Panama.
sororia (Fowler), 1900b:272 (*Tettigonia*). Mexico. New combination.
taeniatifrons (Schmidt), 1928c:89 (*Entogonia*). Colombia, Ecuador, Peru.
tunicata (Fowler), 1900b:271 (*Tettigonia*). Mexico.

KEY TO MALES OF *SIBOVIA*

(*S. optabilis* (Melichar) and *S. inexpectata* (Metcalf and Bruner) not included)

1. Aedeagus broad in caudoventral view (fig. 556*q*, *s*) and paraphyses capitate apically ..... *compta* (Fowler) (fig. 566)
   Aedeagus narrower in caudoventral view, or if broad, then paraphyses not capitate apically 2

2. Aedeagus in lateral view with apex very broadly expanded 3
   Aedeagus in lateral view with apical portion less (figs. 570*f* and 581*f*) or not at all expanded apically in lateral view 5

3. Aedeagus in ventral view with shaft broadest at midlength 4
   Aedeagus in ventral view with shaft broadest at apex *composita* (Fowler) (fig. 567)

4. Coronal pattern consisting of a pair of converging dark vittae on each side (fig. 568*a*) ..... *sororia* (Fowler) (fig. 568)
   Coronal pattern without vittae ..... *recta* (Fowler) (fig. 569)

5. Crown broadly orange-bordered anteriorly .... *pileata* (Fowler) (fig. 570)
   Crown not orange-bordered anteriorly 6

6. Crown with a pair of parallel dark stripes 7
   Crown with stripes convergent or converging, or without stripes 11

7. Forewing with a pale oblique transverse line ending in claval apex *aprica* (Melichar) (fig. 571)
   Forewing without such a line 8

8. Pygofer with a short, acute, mesal apical or anteapical extension in ventral view 9
   Pygofer without such an extension ..... *taeniatifrons* (Schmidt) (fig. 572)

9. Crown with dark stripes each broader than median pale area 10
   Crown with dark stripes each narrower than median pale area *improvisula*, n. sp., page 707

10. Face with two black lines converging below, forewings with a transverse anteapical pale band ..... *picchitula*, n. sp., page 707
    Face with indistinct brown bands, forewings without an anteapical pale band ..... *carahua*, n. sp., page 709

11. Forewing with vein forming outer margin of brachial cell not alternating pale and darker 12
    Forewing with vein forming outer margin of brachial cell alternating pale and darker ..... *praevia* (Melichar) (fig. 576)

12. Median line of pronotum and scutellum not narrowly black or brown 13
    Median line of pronotum and scutellum usually narrowly black, rarely brown 18

13. Lateral clypeal sutures not attaining ocelli; crown broadly orange posteriorly and with a black spot on each side of apex
infula (Melichar) (fig. 577)
Lateral clypeal sutures usually attaining ocelli; crown not so marked 14

14. Scutellum orange, unmarked 15
Scutellum otherwise 16

15. Antennal ledges uniformly pale in lateral view
prodigiosa (Melichar) (fig. 578)
Antennal ledges dark anteriorly in lateral view
chanchama, n. sp., page 711

16. Crown with median line black except just behind apex, with no other coronal black markings ..... *mesolinea* (DeLong and Currie) (fig. 580)
Not as above 17

17. Crown without linear black markings ..... *civilis* (Fowler) (fig. 581)
Crown with two black stripes that converge at apex
sagata (Signoret) (fig. 582)

18. Forewing apex with a black spot in second apical cell
huasima, n. sp., page 711
Forewing apex without a black spot, with transverse dark areas 19

19. Coronal black stripe, which borders each inner basal eye angle, parabolous apically and uninterrupted ..... *conferta* (Melichar) (fig. 584)
Black stripe which borders inner basal eye angle not converging with its complement on apical part of crown (occasionally converging below apex) 20

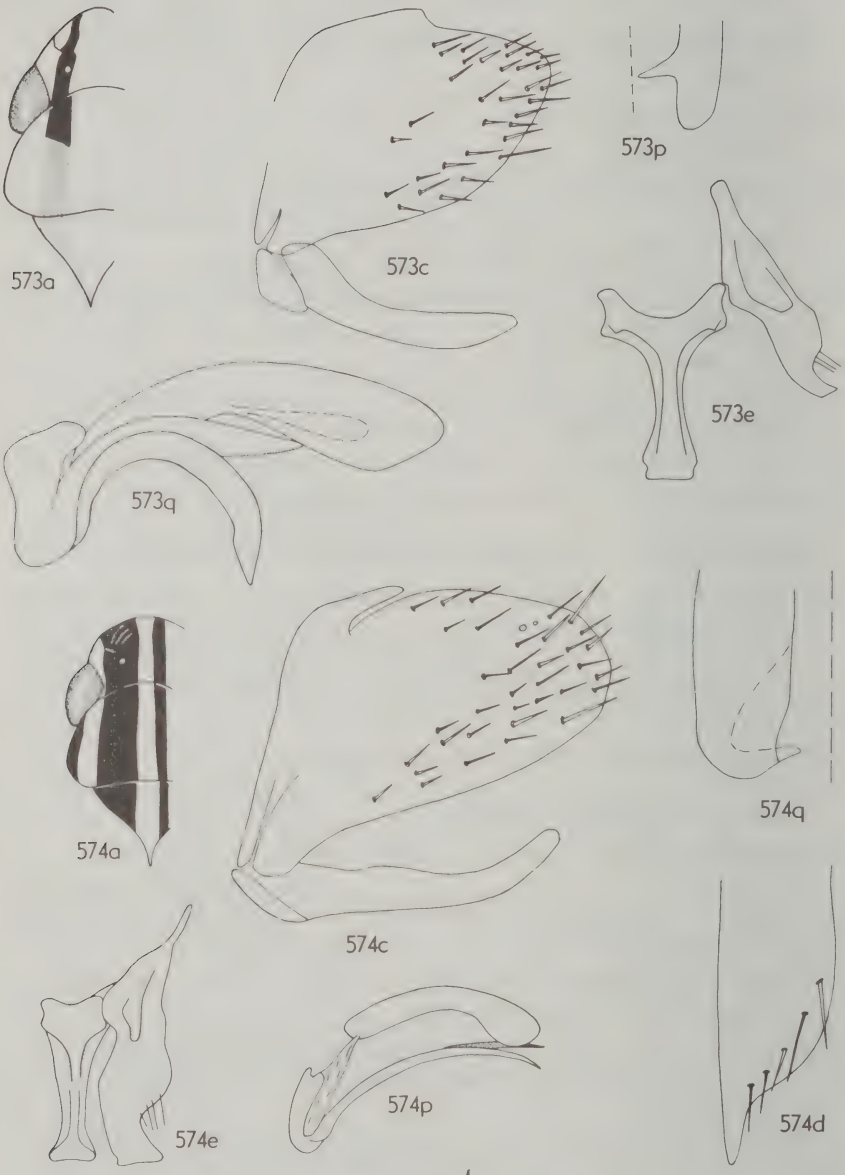
20. Rami of paraphyses each branched near base
skeeleae, n. sp., page 715
Rami of paraphyses not branched 21

21. Aedeagus with shaft abruptly expanded apically in lateral view
tunicata (Fowler) (fig. 586)
Aedeagus with shaft expanded basally, or if broader apically then only gradually so 22

22. Antennal ledge bearing a black stripe ..... *festana,* n. sp., page 717
Antennal ledge without a black stripe 23

23. Paraphyses very elongate in lateral view, extending posterodorsally; style not extending posteriorly more than half as far as midlength of connective 24
Paraphyses much shorter in lateral view, extending posterodorsally; style extending posteriorly beyond midlength of connective
nielsoni, n. sp., page 718

24. Aedeagal shaft narrowed near midlength ..... *occatoria* (Say) (fig. 589)
Aedeagal shaft not narrowed near midlength
occaminis, n. sp., page 722



FIGURES 573, 574.—573, *Sibovia improvisula*, n. sp., holotype: *p*, male pygofer apex, left side, from ventral view; *q*, Aedeagus and crossed paraphyses, from lateral view. 574, *S. picchitula*, n. sp., holotype: *p*, Aedeagus and paraphyses, from lateral view; *q*, male pygofer apex, left side, from ventral view.

Sibovia improvisula, NEW SPECIES

FIGURE 573, PAGE 706

Length of male 6.5 mm. Head with median length of crown seven-tenths interocular width and approximately four-tenths transocular width, clypeus flattened medially. Other external structural characters as in *S. carahua,* n. sp. (below). Male pygofer not well produced for the genus, chaetotaxy as in *carahua,* with a short ventral anteapical acute process that extends mesad almost to median line; plates extending posteriorly almost as far as pygofer apex; style not extending posteriorly as far as apex of connective; connective with stem much longer than arms; aedeagus broadened in apical half, apex obliquely truncate, without shaft processes; paraphyses short, crossed near bases. Female unknown.

Color of anterior dorsum and forewings sordid tan, with a pair of narrow black stripes arising one on each side of coronal apex, crossing ocelli and diverging posteriorly, becoming brown on pronotum and continuing through basal angles of scutellum and forming a broad commissural longitudinal stripe to claval apices, with a broad parallel brown stripe extending from base of corium to base of second apical cell; face, thoracic pleura, and legs sordid tan except a longitudinal black stripe on propleura bordering dorsopleural carina.

Holotype male, San Antonio, El Salto, Durango, Mexico, 5,000 ft., June 10, 1937 (M. A. Embury) (UCAL).

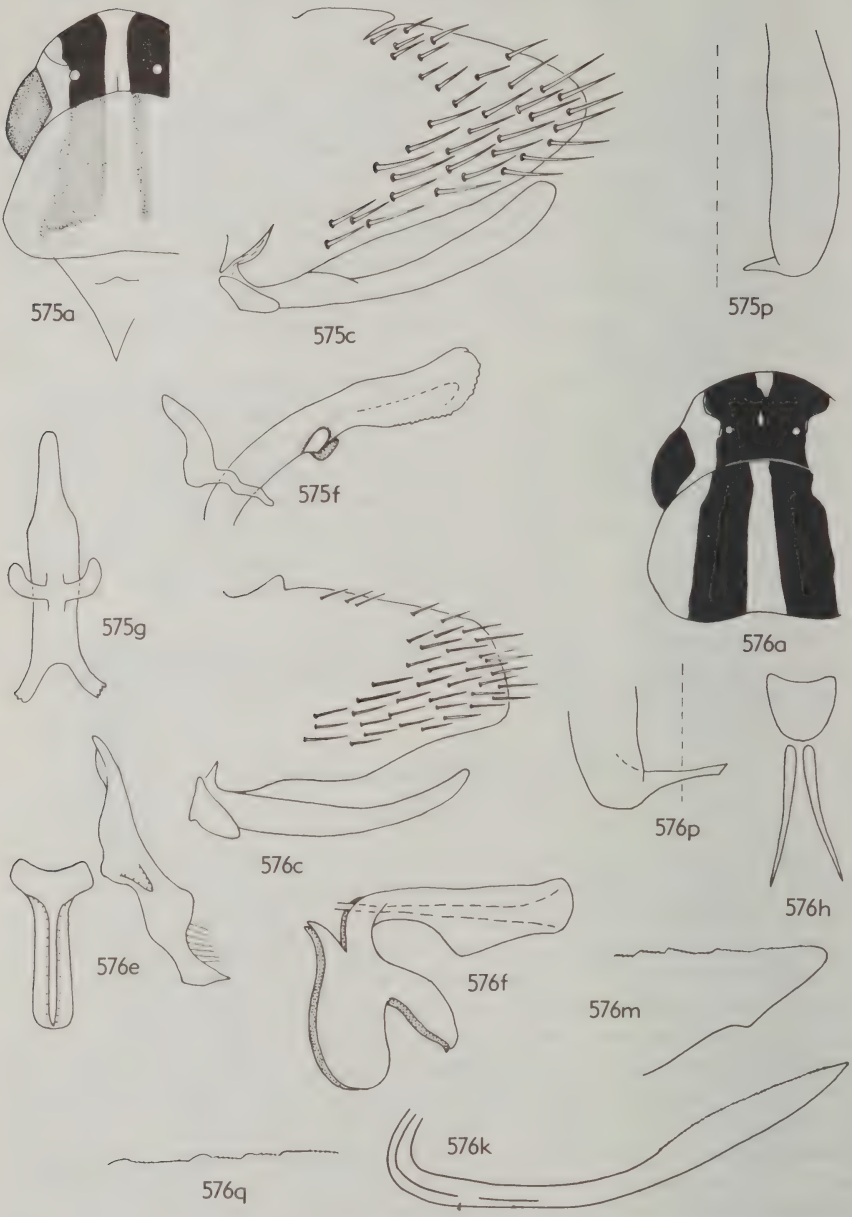
The occurrence of only two longitudinal stripes on the crown and pronotum, the ventral pygofer process, and the crossed paraphyses differentiate *improvisula* from other species of *Sibovia.*

Sibovia picchitula, NEW SPECIES

FIGURE 574, PAGE 706

Length of male 6.0 mm, of female 6.0-6.5 mm. Head with median length of crown varying from slightly less than two-thirds to three-fourths interocular width, and from slightly less than four-tenths to almost one-half transocular width, crown with a slight transverse concavity before ocelli, clypeus convex medially. Pronotum with width approximately equal to transocular width of head. Other external structural characters as in *S. carahua,* n. sp. (below). Male pygofer moderately produced, apex regularly convex, with a very short apical process curving medially, setae as in *carahua;* plates not extending nearly as far posteriorly as pygofer apex, narrowed more abruptly than usual in the genus; style extending posteriorly as far as apex of connective, more broadly truncate apically than in most other species in the genus; connective with stem broader and arms shorter than in most other species of *Sibovia;* aedeagus slender, rounded apically, without processes; paraphyses much as in *S. occatoria* (Say) (fig. 589*h*).

Ground color of dorsum including forewings, black, with a median and two lateral longitudinal yellowish green stripes on crown, the median one extending through pronotum and scutellum and narrowing to form a commissural margin in each clavus to apex of latter, the lateral stripes extending



FIGURES 575, 576.—575, *Sibovia carahua*, n. sp. (from specimen from near Tingo María, Peru): *p*, Male pygofer apex, left side, from ventral view. 576, *S. praevia* (Melichar) (from specimens from Cuzco Province, Peru; *h* from caudoventral view): *p*, Male pygofer apex, right side, from caudoventral view; *q*, basalmost teeth of second valvula.

over the pronotum and diagonally through clavus at its base, continuing on corium to base of second apical cell; black costal margin of forewing bordered by a narrow yellowish green stripe in its basal portion, the stripe supplanted posteriorly by a broader translucent costal border extending almost to base of outer apical cell; face yellow with a black narrowly Y-shaped marking on clypeus and clypellus and a black subantennal area on each gena; thoracic pleura and venter mostly black; legs stramineous except black apices of anterior femora and black apical tarsomeres on all three pairs. Two of the females have brown markings instead of black on the dorsum.

Holotype and two additional males and five females, Macchu Picchu, Peru, November 25, 1967 (D. M. DeLong) (DeLong collection, OSU).

The markings of *S. picchitula,* n. sp. are somewhat similar to those of *S. taeniatifrons* (Schmidt). The form of the styles and connective, and the abruptly narrowed male plates are distinctive for *picchitula.*

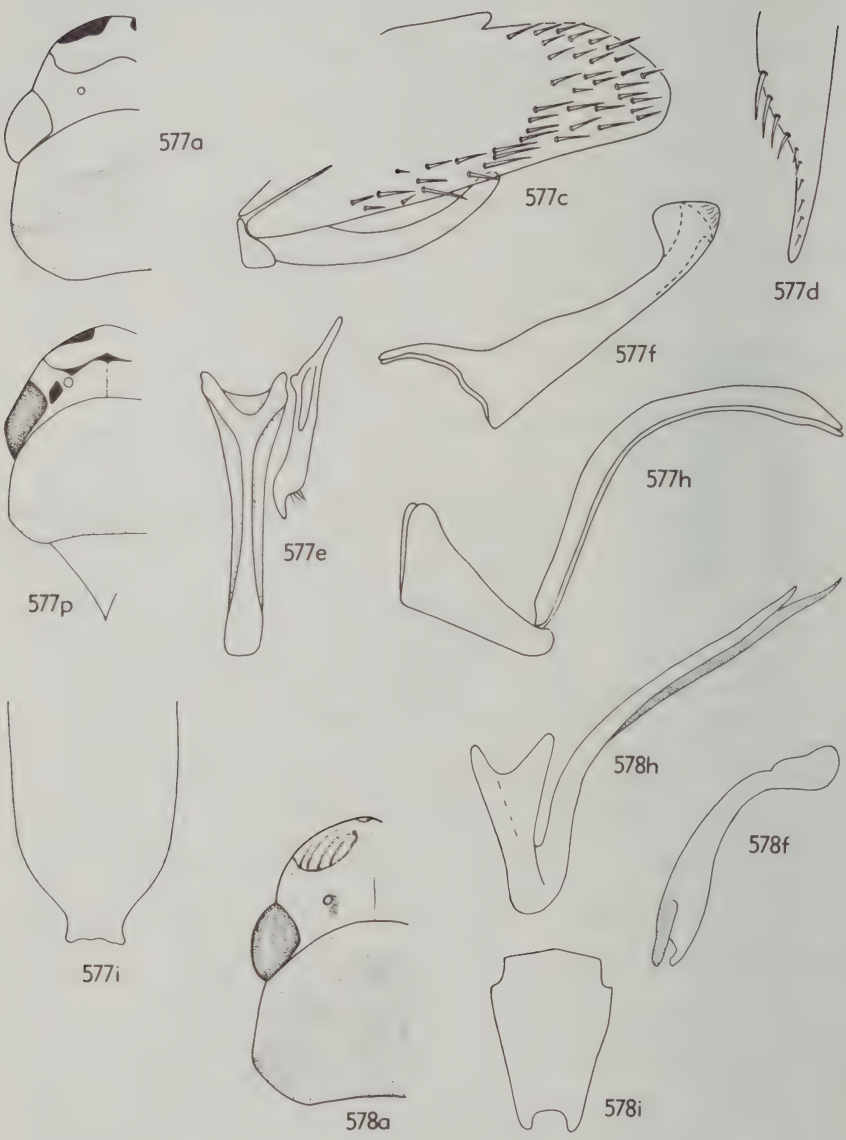
Sibovia carahua, NEW SPECIES

FIGURE 575, PAGE 708

Length of male 6.6-6.7 mm, of female 7.0 mm. Head moderately produced, anterior margin very broadly rounded in dorsal view, median length of crown varying from six-tenths to almost seven-tenths interocular width and approximately four-tenths transocular width, crown with a transverse concavity before ocelli, clypeus slightly flattened medially, transclypeal suture obsolete at middle. Pronotum with width greater than transocular width of head, posterior margin slightly concave. Male pygofer well produced for genus, with apex narrowed to a pointed process which extends mesally but does not reach the median line, pygofer with a number of macrosetae on apical half and also parallel to dorsal and posteroventral margins; plates not extending posteriorly as far as pygofer apex; style not extending posteriorly nearly as far as apex of connective; connective with stem much longer than arms; aedeagus with a pair of short lobate processes arising ventrally on shaft before its midlength (these serve to guide the paraphyses parallel to the shaft); paraphyses as in *S. occatoria* (Say) (fig. 589*h*). Female abdominal sternum VII with posterior margin slightly produced medially in a short, rounded lobe.

Color of head, broad anterior marginal border of pronotum and all of scutellum yellow, with a pair of broad longitudinal black stripes on crown, continuing posteriorly as a pair of dull brown stripes over pronotum almost to its posterior margin; forewing green with a longitudinal dull brown stripe in clavus, crossing claval suture and extending into apex of brachial cell apically, costal margin bordered with dull yellow to orange, narrowly so in basal half, more broadly so in apical half, some specimens with a narrow longitudinal dull brown vitta in corium; face, thoracic pleura and venter of abdomen pale yellow except two narrow brown lines on face, extensions of black coronal stripes, which converge ventrally, and except for black apices of first and second tarsi.

Holotype male and twelve additional specimens of both sexes, "Sinchono", Peru some (not holotype) collected in July, 1944 (DeLong collection OSU).



FIGURES 577, 578.—577, *Sibovia infula* (Melichar) (from specimens from Colombia; *h* from lateral view): *p*, Anterior dorsum of a female. 578, *S. prodigiosa* (Melichar) (*a*, *i*, from lectotype; *f*, *h*, from Colombia; *h* from lateral view).

One male, 26 mi. east of Tingo María, Peru, 1100 m., December 10, 1954 (E. I. Schlinger and E. S. Ross) (CAS).

S. carahua, n. sp., is closely related to *S. taeniatifrons* (Schmidt) from which it may be separated by the form of the aedeagus in lateral view, and by its medially directed process of the pygofer. The two species appear to be sympatric.

Sibovia chanchama, NEW SPECIES

FIGURE 579, PAGE 712

Length of male 7.3 mm, of female 8.3 mm. Head moderately produced, anterior margin broadly rounded in dorsal view, median length of crown from slightly less than two-thirds (male) to two-thirds interocular width and between four- and five-tenths transocular width. Pronotum with posterior margin slightly concave or rectilinear. Other external structural characters as in *S. carahua,* n. sp. Male pygofer well produced, with posterior margin narrowly rounded, without processes, setae as in *carahua;* style not extending posteriorly as far as apex of connective; connective with stem very much longer than arms; aedeagal shaft slender and elongate, slightly broadened in basal half in caudoventral view and bearing a short acute retrorse process on each side of broader portion, apex curved dorsally in lateral view; paraphyses as in *S. occatoria* (Say) (fig. 589*h*). Female abdominal sternum VII well produced, posterior margin shallowly concave.

Crown with median portion orange from base to apex, anterolateral margins broadly sordid yellow, apex with a black spot; pronotum with two poorly defined broad longitudinal stripes from base to apex, orange at their anterior portions and concolorous with crown, their remaining portions dark green suffused with orange, background narrowly pale anteriorly and laterally, remainder green; scutellum orange; forewing dark green, costal margin orange-bordered, with a faint longitudinal orange claval stripe and an oblique orange band bordered with black anteriorly and posteriorly in apical cells, with a narrow black stripe from mid-corium to base of second apical cell and with a black vein forming outer margin of middle anteapical cell; face, thoracic pleura, and legs stramineous except dark tarsal apices.

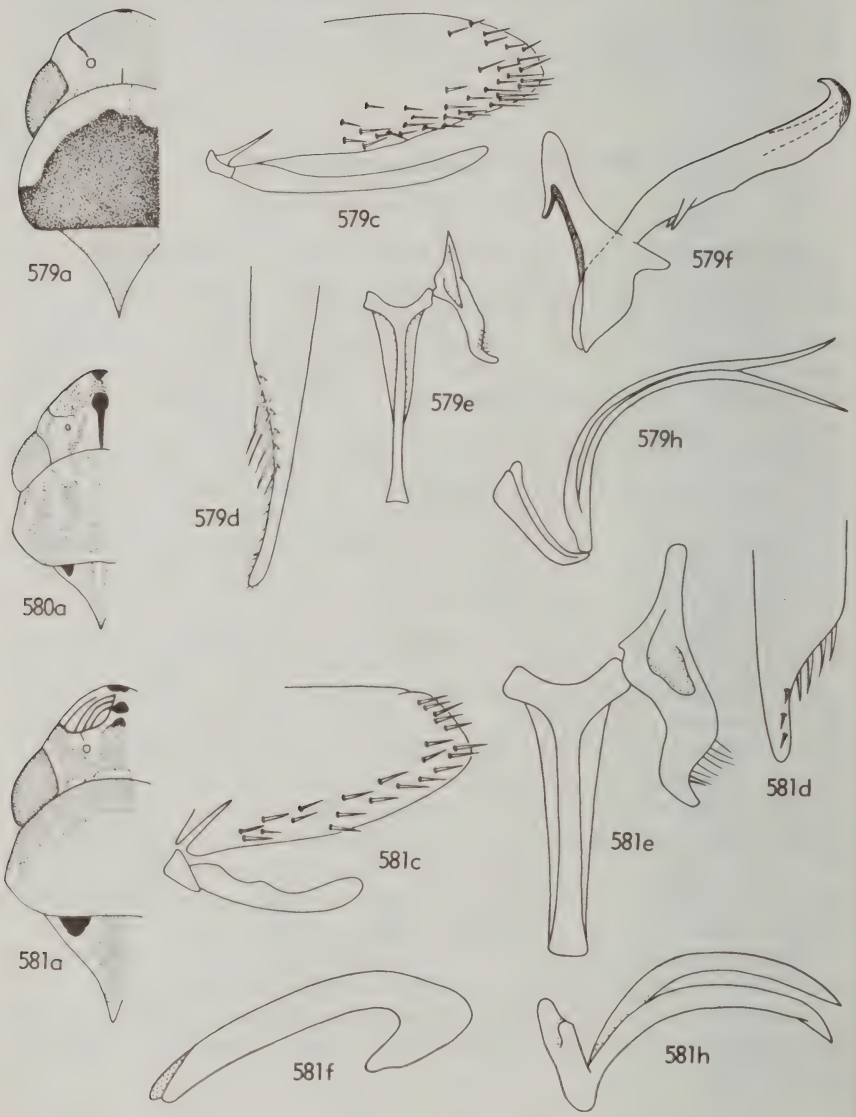
Holotype male and one female, Chanchamayo, Peru, July 25, 1960 (Salazar and Ramirez) (NCS). Holotype on indefinite loan to USNM.

S. chanchama, n. sp., is distinct from other species in the genus in the form of the aedeagus which is curved dorsally at its apex in lateral view, and in its color pattern.

Sibovia huasima, NEW SPECIES

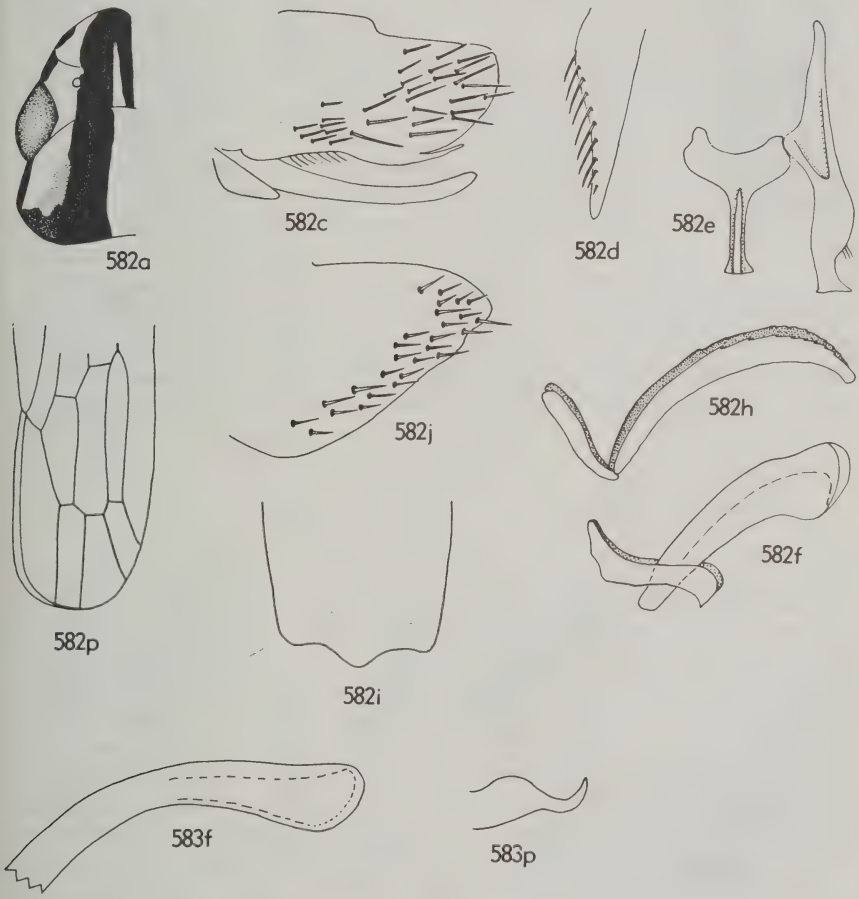
FIGURE 583, PAGE 713

Length of male 6.1-6.3 mm, of female 6.3-6.6 mm. Head well produced, anterior margin sharply rounded in dorsal view, median length of crown varying from almost three-fourths to more than nine-tenths interocular width, and



FIGURES 579-581.—579, *Sibovia chanchama,* n. sp., holotype (*h* from lateral view). 580, *S. mesolinea* (DeLong and Currie), holotype. 581, *S. civilis* (Fowler) (from topotype; *h* from lateral view).

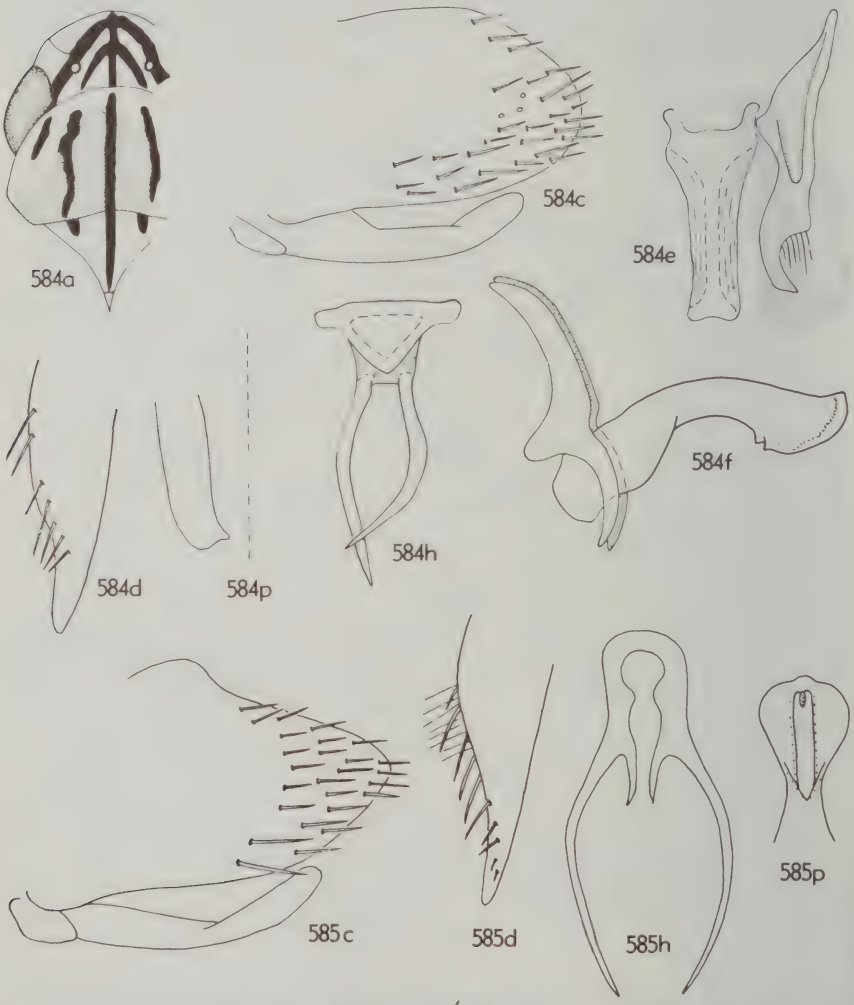
from more than four-tenths to less than six-tenths transocular width, crown with a transverse concavity before ocelli, clypeus slightly flattened medially, transclypeal suture obsolete at midlength. Pronotum with width greater than transocular width of head, posterior margin shallowly concave. Male pygofer well produced for the genus, with apex narrowly and regularly rounded, surface of pygofer with a number of macrosetae of several sizes irregularly arranged parallel to posteroventral margin; plates not extending posteriorly nearly as far as apex of pygofer; connective with stem much longer than arms; aedeagus with shaft regularly curved dorsally then posteriorly, without processes; paraphyses elongate, very slender, in lateral aspect with their



FIGURES 582, 583.—582, *Sibovia sagata* (Signoret) (*a* from specimen from Nova Teutonia, Brazil; *i, j,* from Buenos Aires, Argentina; *p,* from Curitiba, Paraná, Brazil; remainder from Misiones Argentina; *h* from lateral view): *p,* Apical portion of forewing. 583, *S. huasima,* n. sp. (from specimen from Monsón Valley, Peru; only aedeagal shaft shown in *f*): *p,* Apex of right ramus of paraphyses, from lateral view.

apices abruptly narrowed and slightly hooked (fig. 583*p*). Female abdominal sternum VII with posterior margin transverse and broadly and very slightly convex.

Ground color of crown, anterior portion of pronotum, and scutellum, pale olive, of posterior portion of pronotum darker green; crown with a median acute spot at base, an inverted Y-shaped marking in middle, an oblique line on each side extending from inner eye angle to apex, black, with a straight



FIGURES 584, 585.—584, *Sibovia conferta* (Melichar) (*a* from specimen from Mojinga Swamp, Panama; remainder from Panama; *h* from caudoventral view): *p*, Male pygofer apex, right side, from caudoventral view. 585, *S. skeeleae*, n. sp. (from specimen from Concepción, Panama; *h* from caudoventral view): *p*, Aedeagal apex from caudoventral view.

median and four arcuate lateral black stripes on pronotum and three longitudinal black stripes on scutellum; forewing deep green, with or without narrow black lines parallel to veins in clavus and corium, costal margin pale yellow and opaque to base of outer anteapical cell, thence broader and translucent yellow to apex and bearing an oblique more basal and two transverse more apical black stripes, inner apical cell mostly black, second apical cell with a large black spot, apical wing margin narrowly black, remainder of apical cells translucent; face yellow with a median basal black spot and a narrow black stripe extending forward from eye along margin between crown and face on each side, not attaining apex; proepimeron with a longitudinal black stripe beneath dorsopleural carinae; remainder of face, venter, and legs, yellow, except dark tarsal apices.

Holotype male, Tingo María, Peru, August 10, 1960 (O. Vargas); two females, Chanchamayo, Peru, July 23, 1960 (C. Ramírez), on "Marco-Marco" (NCS). Four males, Monsón Valley, Tingo María, Peru, September 23, 1954 (E. I. Schlinger and E. S. Ross); one male and five females, same data as preceding except October 8, 1954; one male, Monsón Valley, Tingo María, Peru, October 8, 1954 (same collectors) (CAS). Two males and three females, Tingo María, June 21, 1962 (W. T. Van Velzen) (USNM). Holotype on indefinite loan to USNM.

S. huasima, n. sp., is very similar in appearance to *S. occatoria* (Say) but can be readily separated from the latter by the different form of the aedeagal shaft of the male in lateral view and by the distinctive form of the apices of the rami of the paraphyses of *huasima.* The male genital characters which are not illustrated in figure 583 are as in the illustration of *occatoria* from El Salvador (fig. 589).

Sibovia skeeleae, NEW SPECIES

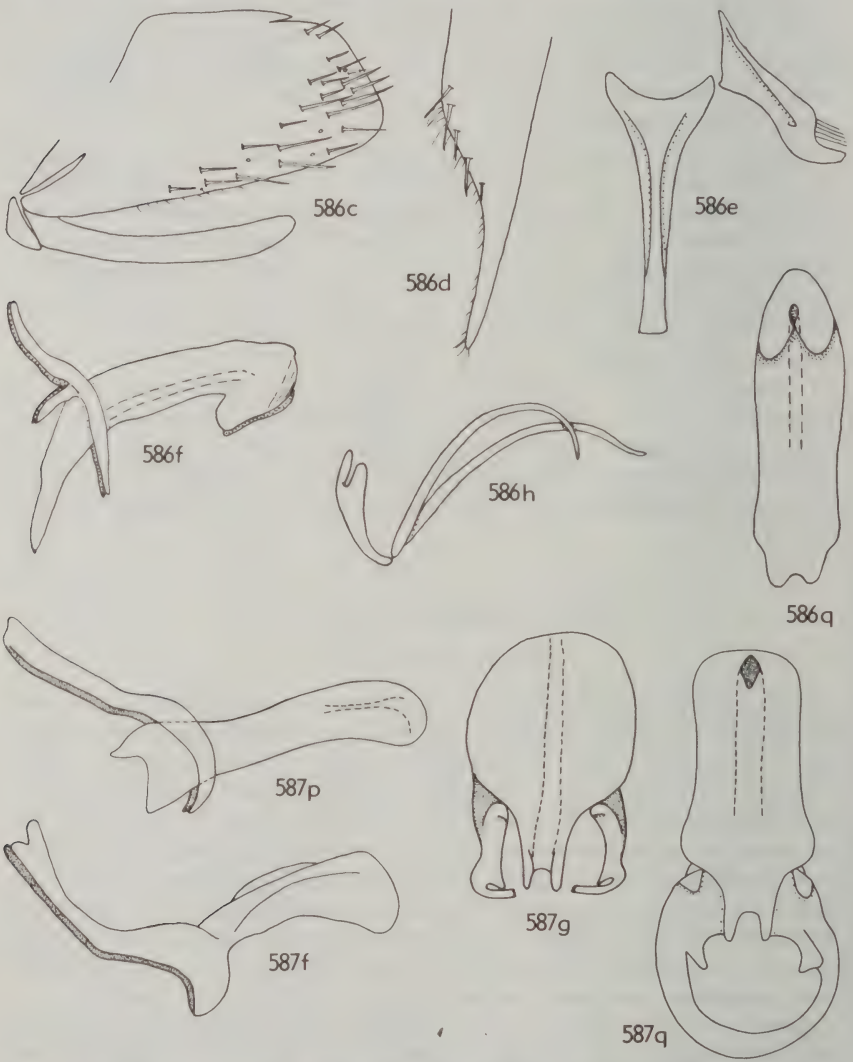
FIGURE 585, PAGE 714

Length of male 4.5-5.5 mm. Head moderately produced for the genus, median length of crown from slightly less than three-fourths to more than eight-tenths interocular width, and slightly less than one-half transocular width, crown scarcely transversely concave before ocelli, clypeus flattened medially or not, transclypeal suture obsolete at middle. Pronotum with width approximately equal to transocular width of head, posterior margin slightly concave. Pygofer short for the genus, with a number of macrosetae in apical half; plates not extending posteriorly as far as pygofer apex; style extending posteriorly beyond midlength of connective; connective with stem much longer than arms; aedeagus without processes, shaft narrowed anteapically in ventral view; paraphyses with each ramus distinctly branched in its basal half.

Color of anterior dorsum as in *S. huasima,* n. sp., except that black lines converging medially on disk are inverted "V"- instead of "Y"-shaped; forewing dull green with some dark longitudinal lines between the longitudinal veins, apical cells translucent with a darker arc at apex and one near midlength of second, third, and fourth apical cells and in inner apical cell curved

basally to base of cell and apically to become continuous with apical arc; face yellow with a median basal black spot, without a marginal black marking before eye; proepimeron with a black spot beneath dorsopleural carina; remainder of face, thoracic pleura, and venter, pale.

Holotype male, San Isidro del General, Costa Rica (D. L. Bounds) and twelve males, same data (NCS). One male, Concepción, Panama, December 9, 1952 (F. S. Blanton) (USNM). Holotype on indefinite loan to USNM.



FIGURES 586, 587.—586, *Sibovia tunicata* (Fowler) (from specimen from Vera Cruz, Mexico; *h* from lateral view): *q*, aedeagal shaft from ventral view. 587, *S. festana*, n. sp. (*f*, *g*, from specimen from Colombia; *p*, *q*, from Venezuela): *p*, aedeagus from lateral view; *q*, same from ventral view.

There are a number of topotypic females at hand, but I haven't associated these with the males with any certainty, for two males of *S. nielsoni,* n. sp., were found with the same collection data.

S. skeeleae, n. sp., can be distinguished from other species in the genus by the branched rami of the paraphyses. I am pleased to name this species for Sue Skeele, who helped greatly in proof-reading part 1 of this study, and who typed most of it.

Sibovia festana, NEW SPECIES

FIGURE 587

Length of male 5.3-6.3 mm, of female 5.6-6.1 mm. Head well produced for the genus, median length of crown from slightly more than three-fourths of, to equal to, interocular width, and from slightly less than one-half to approximately six-tenths (type) transocular width, crown with a very slight transverse concavity before ocelli, clypeus not or only slightly flattened medially, transclypeal suture obsolete at middle. Pronotum with width approximately equal to transocular width of head, posterior margin slightly concave. Pygofer moderately produced for the genus, setal arrangement as described in *S. carahua,* n. sp.; plates not extending nearly as far posteriorly as pygofer apex; style extending posteriorly approximately as far as apex of connective; connective with stem slightly longer than arms; aedeagus without processes, shaft broad through most of its length. Female abdominal sternum VII as in *carahua.*

Color of crown, pronotum, and scutellum as in *S. huasima,* n. sp. (above); forewing colored as in *huasima,* but without three transverse short black marks in costal area near its apex; inner apical cell smoky subhyaline except near inner margin, the smoky area extending laterally as a band and narrowing across second, third, and fourth apical cells near their midlength to costal margin, and a similar narrower apical band, with a transverse opaque yellow band separating the two dark bands, and another similarly colored transverse yellow band extending across bases of second, third, and outer apical cells and to costal margin; color of face and venter as in *huasima.*

Holotype male and one female, Popayan, Colombia, 1760 m., April 15, 1948 (Pfaff); two males and one female, San Estebán, Venezuela, November 22-30, 1939 (P. Anduze) (USNM). Five females and one male, Palmira, Colombia, August 8, 1958, on "*Grama brava*" (a grass) and "*Dolichos*" (a genus of legumes); three females, Manizales, Colombia, September 16, and October 22, 1959 (R. F. Ruppel) on *Dolichos* sp.; two females Juananbu, Nayarit, Colombia, February 1, 1960 (B. Yanguatin), on legumes; one male, Sasaima, Cundinamarca, Colombia, April 1, 1961, 1500 m. (RFC).

Since the above was written, I have seen additional specimens from beans and from "Soya" from Colombia, and from cacao from Ecuador.

Sibovia nielsoni, NEW SPECIES

FIGURE 588

Length of male 4.5-6.3 mm, of female 5.8-6.6 mm. Head moderately produced, anterior margin narrowly rounded in dorsal view, median length of crown varying from slightly more than six-tenths to approximately eight-tenths interocular width, and from four-tenths to slightly more than one-half transocular width, crown with a very weak transverse concavity before ocelli, clypeus usually not flattened medially, transclypeal suture obsolete at middle. Pronotum with width approximately equal to transocular width of head, lateral margin slightly concave. Male pygofer short for genus, with posterior margin broadly and regularly convex, with a number of macrosetae of different sizes located on apical half, plates extending posteriorly as far as pygofer apex; style extending posteriorly to or beyond midlength of connective; connective with stem much longer than arms; aedeagus without processes on shaft which is broader at base than at apex, in caudoventral view with sides gradually convergent to rounded apex; paraphyses much shorter than in *S. occatoria* (Say). Female abdominal sternum VII as in *S. carahua,* n. sp. (above).

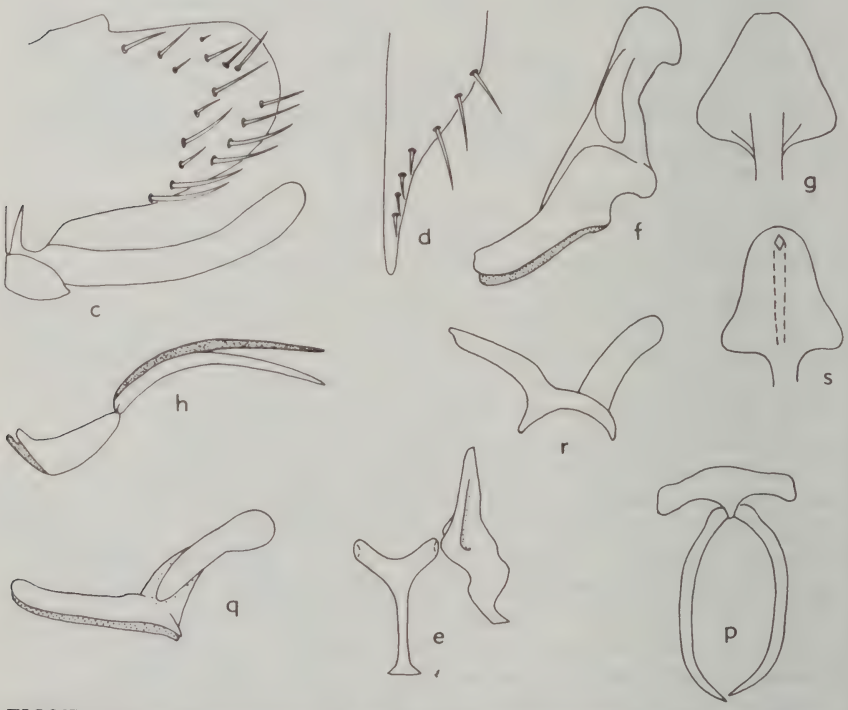


FIGURE 588.—*Sibovia nielsoni,* n. sp. (*c, d, h,* from specimen from Waspuc River, Nicaragua; *f, g, p,* from Playas, Ecuador; *e, r,* from Panama; *q, s,* from Baños, Ecuador; *h* from lateral view): *p,* Paraphyses from caudoventral view; *q, r,* aedeagus from lateral view; *s,* aedeagus from caudoventral view.

Color of crown, pronotum, and scutellum as in *S. huasima,* n. sp.; forewings as in *S. festana,* n. sp.; face, pleura, and venter as in *huasima* except that there is no narrow black stripe extending forward from eye along margin between crown and face.

Holotype male, Pedro Miguel, Panama Canal Zone, September 9, 1946 (N. L. H. Krauss); one male and two females, same data; three specimens, Paraiso, Canal Zone, January 18, February 3, and February 7, 1911 (August Busck); two specimens, Taboga Island, Panama, June 14, 1911 (August Busck); fifteen specimens, Taboga Island, Panama, September 21, 22, 1918 (H. F. Dietz); one specimen, Gamboa, Canal Zone, July 18, 1918 (H. F. Dietz); three specimens, Ocú, Panama, June 1953 (N. L. H. Krauss), two specimens, "Cucumbers", Summit, Canal Zone, October 30, 1918 (H. F. Dietz); eight specimens, Summit, Panama Canal Zone, September, 1946; one specimen, Juan Minas Plantation, Panama Canal Zone, July 13, 1918 (H. F. Dietz and J. Zetek) (swept from grass and cowpeas); one specimen, same locality, August 24, 1918 (same collectors); one specimen, Yucatán, Mérida, Mexico, November, 1961 (N. L. H. Krauss); one specimen, Vera Cruz, V. C., Mexico, November 1961 (N. L. H. Krauss); one specimen, two miles northeast of San Miguel, Cozumel, Mexico, March 4, 1960 (J. F. G. Clarke); four specimens, Tuxtepec, Oaxaca, Mexico (M. Fraire); one specimen, same data as last preceding except collector; (J. Camelo G.); 11 specimens, Turrialba, Costa Rica, June 22 (9) and May 31 (2), 1951 (O. L. Cartwright); five specimens, same locality, 1946 (R. Perez); one specimen, same locality, August 17, 1944 (E. J. Hambleton), on beans; four specimens, Tegucigalpa, Honduras, March 28 and March 30, 1917 (F. J. Dyer); fifteen specimens, La Ceiba, Honduras, January 1, 1916 (1), February 20, 1916 (1), August 6, 1916 (2), August 15, 1916 (1); August 25, 1916 (1), September 24, 1916 (3); December 2, 1916 (1), December 3, 1915 (1), December 17, 1915 (2), December 19, 1916 (2) (all F. J. Dyer); four specimens, Guatemala, on cotton (Schwartz and Barber); one specimen, Dominica, B. W. I., forest, 800 m., June 15, 1941 (R. G. Fennah); one specimen, Dominica, June-July (H. W. Foote), Yale Exp., 1913; six specimens, Dominica, W. I., freshwater lake, 21 January, 1965 (W. W. Wirth); one specimen, Black Forest Estate, Grenada, B. W. I. (H. H. Smith); four specimens, Quilesse, Sta. Lucía, B. W. I., 1000 ft., February 22, 1941 (R. G. Fennah); three specimens, Montserrat, Trinidad, B. W. I., June 29, 1905 (August Busck); three specimens, Trinidad Island, July 12, 1902, July 20, 1902, and September, 1902; five specimens, Palo Seco, Trinidad, October 12, 1918 (1) and October 20, 1918 (4) (Harold Morrison); eighty-seven specimens, "River Estate", Trinidad, October 16, 1918 (H. Morrison); one specimen, "D'Abadio", Trinidad, October 15, 1918 (H. Morrison); one specimen, Caroni River, Trinidad, October 12, 1918 (H. Morrison); one specimen, "La Brea", Trinidad, October 18, 1918 (H. Morrison); four specimens, Trinidad, B. W. I. (P. R. Uhler collection); one specimen, St. Augustine, Trinidad, February, 1954; four specimens, Turbaco, Colombia, June, 1953 (N. L. H. Krauss); one specimen, Cartagena, Colombia, June, 1953 (N. L. H. Krauss); one specimen, Salvador, Bahia, Brazil, October, 1961 (N. L. H. Krauss) (all above in USNM).

Also one specimen, two miles southeast of Ocosingo, Chiapas, Mexico, March 8, 1953 (E. I. Schlinger); one specimen, five miles south of San Carlos, Chiapas, Mexico, March 6, 1953 (R. C. Bechtel and E. I. Schlinger); one specimen, 5 km. northeast of Villahermosa, Tabasco, Mexico (J. K. Drew) on *Cucurbita moschata;* one specimen, Simojovel, four miles south of Chiapas, Mexico, March 18, 1953 (R. C. Bechtel and E. I. Schlinger); twenty-four

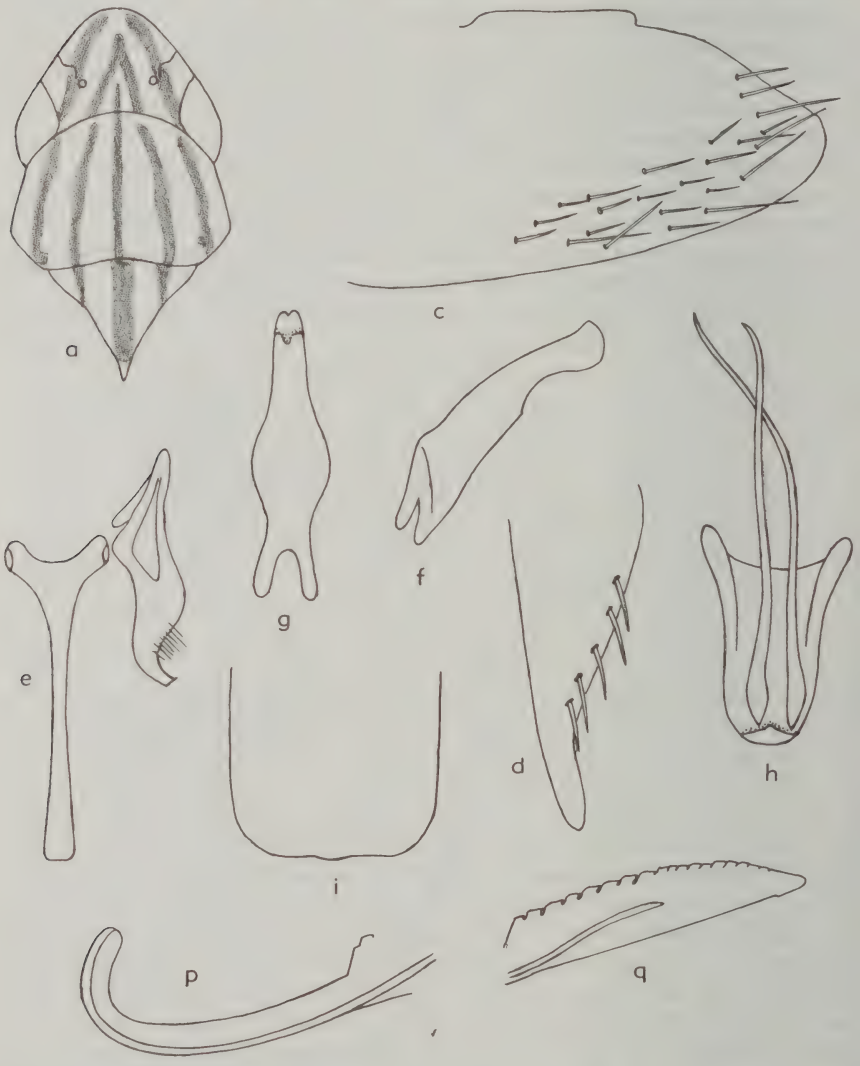
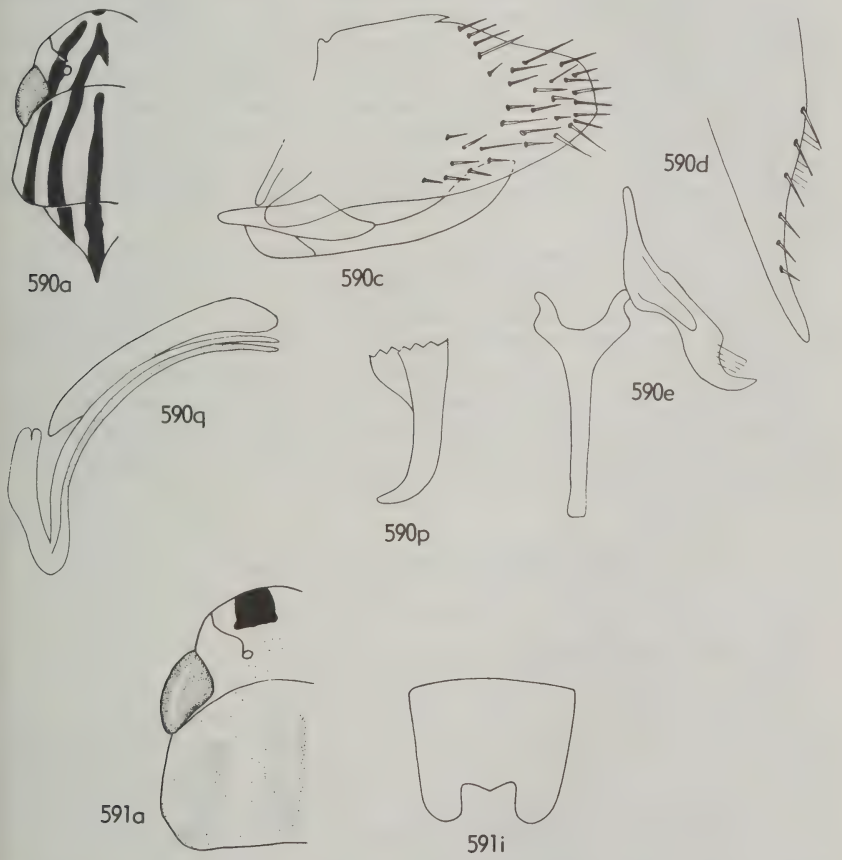


FIGURE 589.—*Sibovia occatoria* (Say) (from specimens from El Salvador; plate not shown in *c; h* from caudoventral view): *p,* Basal half of second valvula; *q,* apical half of same.

specimens, Musawas, Waspuc River, Nicaragua, October 7-12 (4), October 22-24 (1), October 23 (6) October 26 (13), 1955 (B. Malkin); eleven specimens, Quezaltepeque, El Salvador, 500 m., July 5, 1963 (D. Q. Cavagnaro and M. E. Irwin); one specimen, same data except June 19; two specimens, Grecia, Costa Rica, November 27, 1955 (B. Malkin); two specimens, Palmares, Costa Rica, December 7, 1955 (B. Malkin); two specimens, Turrialba, Costa Rica (B. Malkin) (UCAL).

Also six specimens, Surrubres, Costa Rica, 300 feet (A. Heyne); one specimen, Mexico (Gillette) (MMB). Also, twenty-eight specimens, Chapada, Brazil; four specimens, Los Amates, Guatemala, February 25, 1905 (CM). Also, fourteen specimens, El Zamorano, "Francisco Morazan", Honduras (Paul H. Freytag and George F. Freytag) (OSU). Also, one male, twenty miles south of Monterrey, Nuevo León, Mexico, November 7, 1946 (F. E. Skinner).



FIGURES 590, 591.—590, *Sibovia occaminis*, n. sp., holotype: *p*, Male pygofer apex, left side from ventral view; *q*, aedeagus and paraphyses, from lateral view. 591, *S. optabilis* (Melichar), lectotype.

I am pleased to name this species in honor of Dr. M. W. Nielson who has contributed greatly to our knowledge of Cicadellidae.

S. nielsoni is closely related to *S. occatoria* (Say) with which it has been confused by some earlier workers. It may be distinguished from *occatoria* by its shorter pygofer, shorter paraphyses and shorter connective. *S. nielsoni* is one of the commonest species in Central America.

Sibovia occaminis, NEW SPECIES

FIGURE 590, PAGE 721

Length of male 6.0-6.4 mm, of female 6.4 mm. Head with median length of crown from two-thirds to three-fourths interocular width and from four-tenths to almost one-half transocular width. Other external structural characters as in *S. carahua*, n. sp. Male pygofer well produced for genus, with apex curved mesad and almost attaining median line, chaetotaxy as in *carahua;* plates not extending posteriorly nearly as far as apex of pygofer; style not extending nearly as far posteriorly as apex of connective; connective with stem much longer than arms; aedeagus slender, without processes, not narrowed near midlength in either lateral or caudolateral view; paraphyses elongate, slender, tapering gradually, attaining aedeagal apex, the rami arising slightly asymmetrically from the basal portion. Female abdominal sternum VII as in *S. occatoria* (Say) (fig. 589*i*).

Markings of anterior dorsum as in *S. occatoria* (fig. 589*a*); forewing, face, thoracic pleura, and venter as in *S. huasima*, n. sp.

Holotype male, San Gerónimo, Guerrero, Mexico, July 2, 1935; one male, July 2, 1935, one male and one female, May 30, 1935, and one female, May 22, 1935, all from Vergel, Chiapas, Mexico (D. M. DeLong collection, OSU).

S. occaminis, n. sp., is closely related to *S. occatoria*, from which males may be distinguished by the strongly curved pygofer apex, by the aedeagus which is not narrowed near midlength, and by the paraphyses which are slightly asymmetrical in the origin of the rami in *occaminis*.

93. PEGOGONIA, NEW GENUS

FIGURE 592

Type-species: *Cicada rufipes* Fabricius.

Length of male 14.0-14.5 mm, of female 14.0-16.0 mm.

Head slightly produced, median length of crown from slightly less than four-tenths to slightly greater than four-tenths interocular width and from slightly more than one-fifth to one-fourth transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line, crown with a transverse concavity, without median fovea and without sculpturing or setae, lateral clypeal

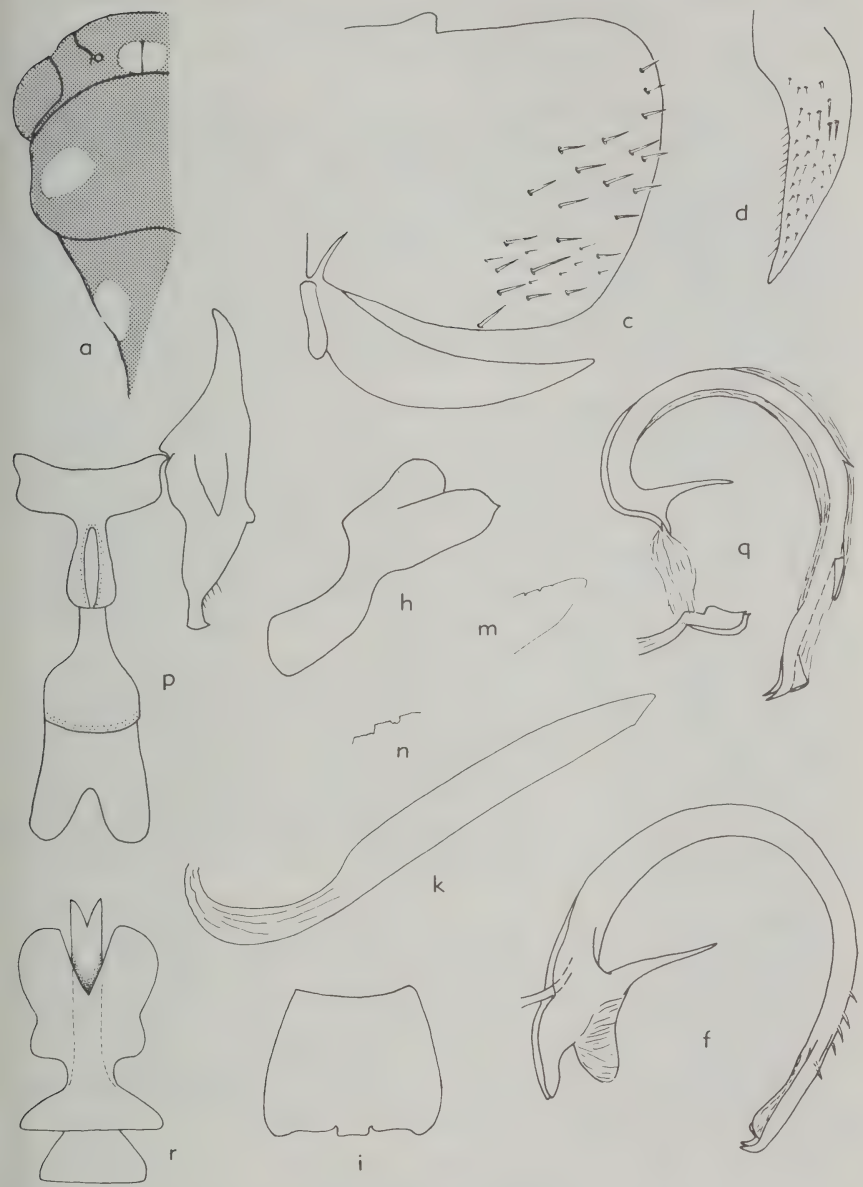


FIGURE 592.—*Pegogonia rufipes* (F.) (*a* from lectotype; *c*, *d*, *q*, from specimen from French Guiana; *f*, *h*, *p*, from Bogotá, Colombia; remainder from Maroni River, French Guiana; *d* from lateroventral view; *h* from lateral view): *p*, Style, connective, and paraphyses, from dorsal view; *q*, aedeagus and paraphyses, from lateral view; *r*, sclerite of dorsal wall of genital chamber.

sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins obliquely rectilinear; clypeus not strongly convex, muscle impressions not very distinct, face without pubescence.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, posterior margin slightly concave, disk without sculpturing; scutellum not striate behind transverse sulcus. Forewing without a membrane, veins not very distinct; with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1:1; length of first tarsomere greater than combined length of more distal tarsomeres and with parallel longitudinal rows of small setae on plantar surface.

Male genitalia: Pygofer short, posterior margin subtruncate, macrosetae sparsely arranged on posterior half and with a few microsetae. Plates not extending as far posteriorly as pygofer apex, each triangular, with a few macrosetae and numerous microsetae. Style extending approximately as far posteriorly as apex of connective, without preapical lobe. Connective T-shaped, with a median keel. Aedeagus symmetrical, elongate, crescentiform, its apex directed ventrally, with a pair of processes at its base and another pair at apex and with smaller setalike processes along length of shaft. Paraphyses paired, symmetrical, greatly reduced.

Female abdominal sternum VII with posterior margin transverse, with a very slight median quadrate lobe. Dorsal membrane of genital chamber with a complex hinged sclerite. Ovipositor with second valvulae each broadened beyond basal curvature, bearing dorsal quadrate teeth, each with minute secondaries, almost to apex which is narrowly rounded; anteapical denticulations obscure on dorsal and apicoventral margins. Pygofer moderately produced and narrowly rounded posterodorsally, with numerous macrosetae in a band parallel to posteroventral margin.

Pegogonia occurs in the Guianas, Trinidad, Venezuela, Colombia, and Peru. *Pegogonia* is similar to *Balacha* Melichar in the curvature of the aedeagus, the multiseriate plates, and the presence of paraphyses, in the male; and in the form of the second valvulae of the female and in the non-produced abdominal sternum VII. The form of the head differs in the two genera, being more produced in *Balacha*, and the latter is much less robust than *Pegogonia*.

The following synonymy is based on a study of the lectotype of *Cicada rufipes* Fabricius and the holotype of *Tettigonia decora* Walker.

SPECIES OF *PEGOGONIA*

rufipes (Fabricius), 1803a:68 (*Cicada*). Br., Fr., and D. Guiana; Trinidad Is.; Venezuela, Colombia, Peru. New combination.

decora (Walker). 1851b:744 (*Tettigonia*).

94. Genus BALACHA Melichar

Figures 593, 594

Balacha Melichar, 1926a:343. Type-species *Tettigonia melanocephala* Signoret, by subsequent designation of China, 1938d:184.

Length of male 6.8-8.7 mm, of female 8.8-9.8 mm.

Head moderately to strongly produced, median length of crown from slightly more than six-tenths to slightly more than eight-tenths interocular width and from slightly more than four-tenths to slightly more than one-half transocular width, anterior margin varying from broadly rounded to subangulate in dorsal view, without a carina at transition from crown to face, ocelli located on or behind a line between anterior eye angles, and variable interspecifically in location with respect to relative distance from median line and adjacent anterior eye angle, crown with a transverse concavity before ocelli and a median fovea extending from the concavity to hind margin, surface without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledge not protuberant, in lateral view with anterior margin rectilinear and slightly oblique, not carinate dorsally; clypeus flattened, muscle impressions not very distinct, transclypeal sulcus almost always entire, clypellus not strongly produced but in profile with its ventral portion curved more posteriorly than remainder of face.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave, disk transversely rugose, not pubescent; scutellum transversely striate behind transverse sulcus. Forewing without a membrane, veins not distinct, with four apical cells, base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin broadly convex, with a convexity at base of posteroventral margin, with macrosetae on posterior portion only (*B. melanocephala* (Signoret)) or extending anteroventrally almost to base. Plates fused basally or not, slender, triangular, rounded apically, not extending posteriorly as far as pygofer apex, each with numerous macrosetae or mixed macro- and microsetae extending from near base to or almost to apex. Style extending posteriorly much farther than apex of connective, without preapical lobe; connective triangular or in form of transverse bar, keeled; aedeagus symmetrical, curved at its base through 180°, shaft slender and with a pair of apical processes; paraphyses present or absent.

Female (unknown in *B. distincta* (Signoret)) abdominal sternum VII with posterior margin almost rectilinear, slightly and very broadly convex. Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvula narrow in basal one-third of portion beyond basal curvature, remainder expanded dorsally and bearing large quadrate primary teeth, each bearing

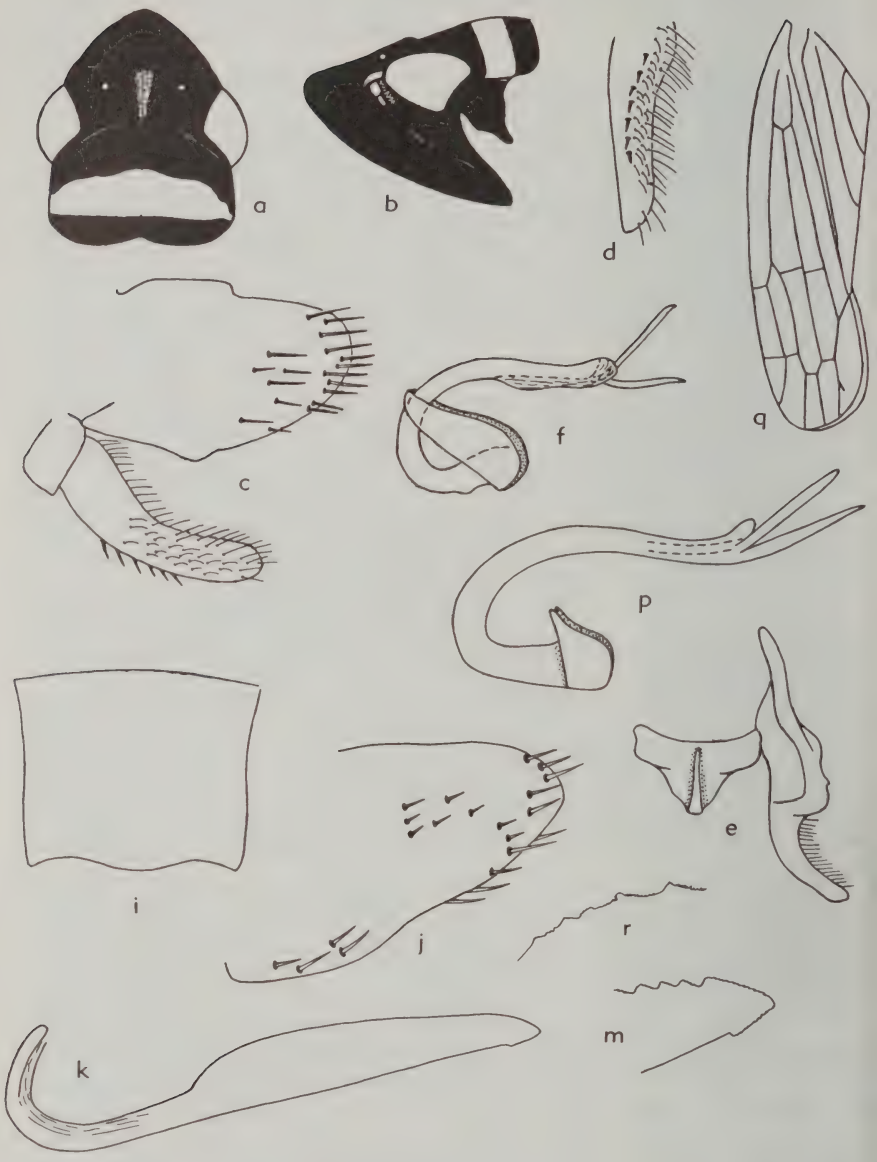


FIGURE 593.—*Balacha melanocephala* (Signoret) (*a, b,* from specimen from Chaco, Paraquay; *c-f,* from Formosa, Argentina; remainder from Rio Grande do Sul, Brazil): *p,* Aedeagus from lateral view; *q,* forewing; *r,* basalmost teeth of second valvula.

minute secondaries, almost to apex which is acute and with anteapical dorsal and ventral denticles. Pygofer with a few small macrosetae near middle of disk, a few larger ones located basiventrally, and a more numerous group near apex.

Specimens of *Balacha* have been examined from Colombia and southeastern Brazil, Uruguay, Paraguay, and northern Argentina. *Balacha* is in the *Erythrogonia* generic group. Similarities to *Pegogonia,* new genus, are discussed in the above treatment of that genus. I have also placed it near *Pawiloma,* new genus, because of similarities in the male genitalia (decurved aedeagal shaft with apical processes) to one species, and because of somewhat closer similarities in the female (fig. 593) to *P. amoena* (Walker) (fig. 599) (transverse apical margin of abdominal VII, similarity in pygofer chaetotaxy, narrowed basal portion of second valvulae). *Balacha* may be associated with *Sibovia* China, also, through the curvature of the aedeagal shaft, restricted area of teeth on second valvulae, and unproduced posterior margin of abdominal sternum VII, but the relationships are probably not close. *Balacha* differs from both *Sibovia* and *Pawiloma* in the more drastic curvature at the aedeagal base and in the multiseriate setae on its male plates.

The present interpretation of *Tettigonia distincta* Signoret is based on a study of the male lectotype, the only specimen I have seen, of that species. I have based my interpretation of *B. melanocephala* (Signoret) on the original illustration of the species, and in conformity with a specimen in the Moravian Museum determined by Melichar. A specimen of *melanocephala* collected on Isla Vizcaíno, Río Negro, Uruguay, by C. Carbonall (USNM) bears the host plant label "Eryngium sp.".

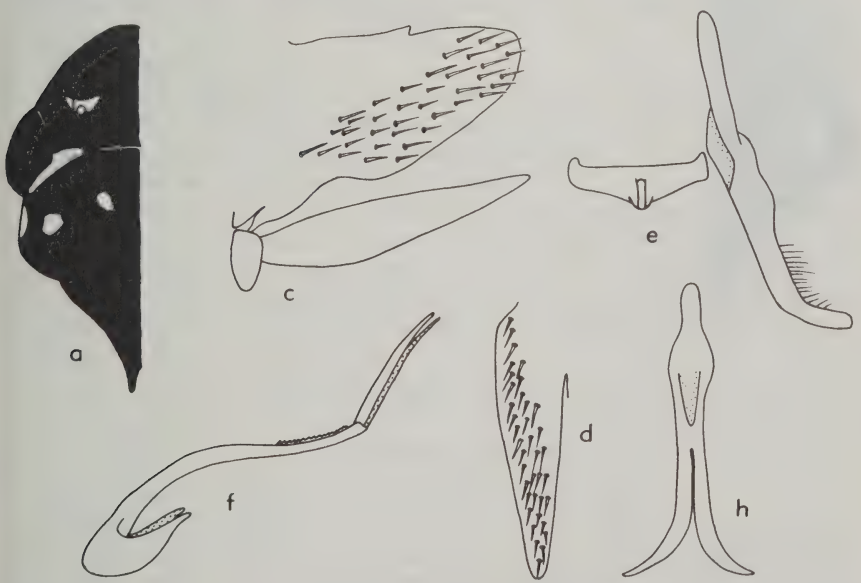


FIGURE 594.—*Balacha distincta* (Signoret), lectotype (*h* from dorsal view).

SPECIES OF *BALACHA*

distincta (Signoret), 1854a:27 *(Tettigonia)*. Colombia.

melanocephala (Signoret), 1854b:341 *(Tettigonia)*. N. Argentina, Uruguay, SE. Brazil, Colombia.

KEY TO SPECIES OF *BALACHA*

Forewings black; with conspicuous white markings on pronotum and forewings; male genitalia without paraphyses
melanocephala (Signoret) (fig. 593)

Forewings dull reddish; with no white markings on pronotum or forewings; male genitalia with paraphyses ..... *distincta* (Signoret) (fig. 594)

95. MIAROGONALIA, NEW GENUS

FIGURE 595

Type-species: *Tettigonia chevrolatii* Signoret (1855d:778).

Length of male 9.0 mm.

Head moderately produced with anterior margin bluntly subangulate in dorsal view, median length of crown approximately one-half interocular width, and three-tenths transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant

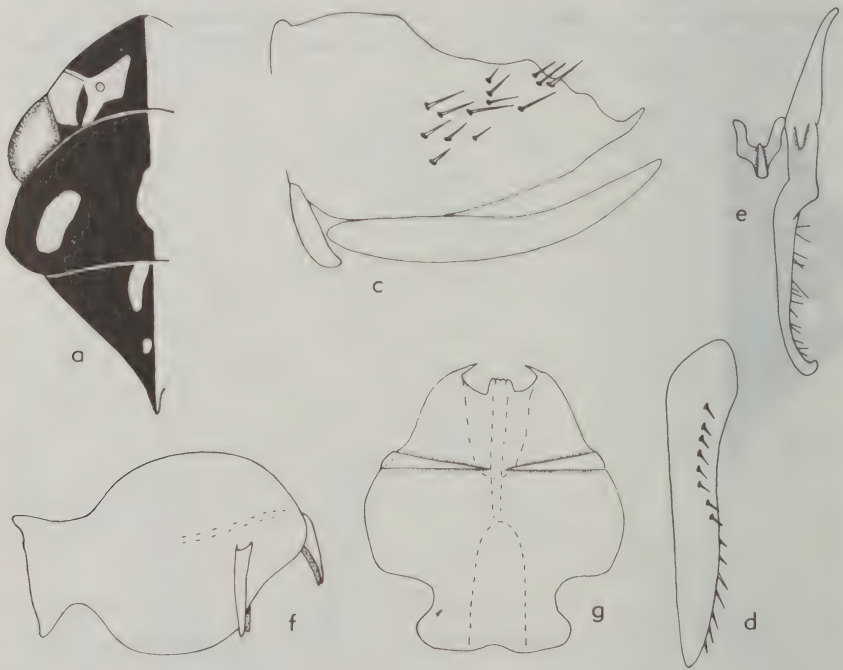


FIGURE 595.—*Miarogonalia chevrolatii* (Signoret) (from specimen from Rancho Grande, Venezuela).

from median line of crown and adjacent anterior eye angle, disk of crown convex; surface of crown glabrous, without setae and with indistinct sculpturing, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with their anterior margins vertical and slightly concave; clypeus flattened medially, muscle impressions distinct, clypellus with contour of its lower portion more nearly horizontal than profile of remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin shallowly concave, disk glabrous and weakly concave; scutellum not transversely rugose behind transverse sulcus. Forewing without a membrane, veins obscure except at apex, with three anteapical cells of which the bases are proximal to claval apex, with four apical cells of which base of outermost is more proximal than base of third, texture opaque. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, gradually tapered to acute apex, with few macrosetae in a group extending from middle of disk to posterodorsal margin; pygofer processes absent. Plates very slender, narrowly rounded apically, extending posteriorly as far as pygofer apex, each with a row of small macrosetae. Style extending posteriorly much farther than apex of connective, rounded apically, without a preapical lobe. Aedeagus inflated, shaft pyriform in ventral view with a pair of aciculate processes arising laterally on shaft near its midlength and extending mesad, almost meeting at median line, and a pair of shorter apical acute processes directed ventrally. Paraphyses absent.

Female unknown.

Miarogonalia, new genus, is known only from the type-species, a shining black species with sanguineous spots. It is known to me only from a single male from Rancho Grande, Venezuela in USNM, determined by Dr. Kramer, which agrees well with the original illustration.

It is difficult to assess the possible relationships of *Miarogonalia* to other genera from the male alone. I have placed it near *Pawiloma,* new genus, because of similarities in the location of the aedeagal processes and in the form of the style and connective to structures found in that genus, but the attenuate pygofer and the inflated aedeagal shaft differ from all species of *Pawiloma.*

96. PAWILOMA, NEW GENUS

FIGURES 596-607

Type-species: *Tettigonia amoena* Walker.

Length 7.2-10.4 mm.

Head moderately produced, median length of crown varying from slightly more than four-tenths to seven-tenths interocular width, and from one-fourth to more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each

usually approximately equidistant from adjacent anterior eye angle and median line of crown (closer to adjacent anterior eye angle in *P. ancora,* n. sp.), crown with a transverse concavity across ocelli, without a median fovea and without sculpturing or setae; lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant in dorsal view, in lateral view with anterior margins oblique and usually convex; clypeus convex or slightly flattened medially, muscle impressions distinct or not; transclypeal suture entire or interrupted medially; clypellus in profile with its lower portion more nearly horizontal than remainder of face.

Thorax with pronotal width varying from less than to greater than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete or not, posterior margin shallowly concave, disk without sculpturing or weakly transversely rugulose; scutellum rugose or not behind transverse sulcus. Forewing with membrane distinct or not, veins distinct or not, with three closed anteapical cells of which the bases of at least the outer two are proximal to claval apex, and four apical cells, the base of

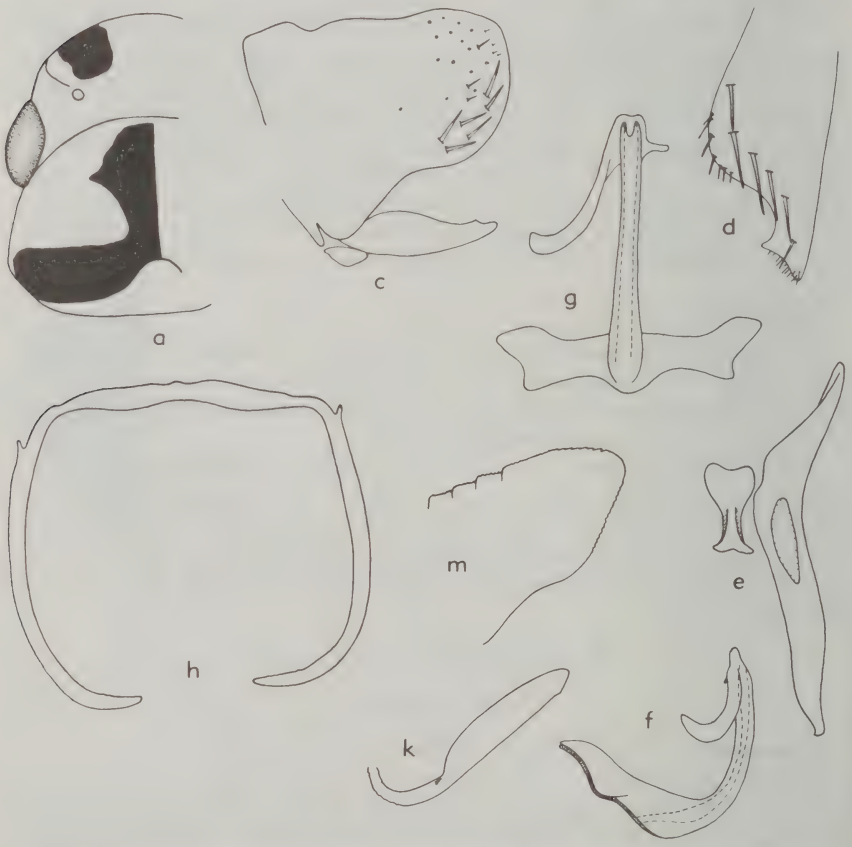


FIGURE 596.—*Pawiloma festiva* (Melichar) (*k, m,* from specimen from Cauca, Colombia; remainder from Colombia; *h* from dorsal view).

the fourth more proximal than base of third, without an anteapical plexus of veins, texture variable interspecifically from translucent to opaque. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere varying from approximately equal to (*P. victima* (Germar)) to greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer varying from slightly to moderately produced, with or without processes which are variable interspecifically when present, setae from few to many, located on posterior half. Plates variable interspecifically in form, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae (exception: *P. eclesia* (Melichar)). Style variable interspecifically as to posterior extent compared to apex of connective and as to form of apex, but not broadly truncate at apex (exception: *ancora*, n. sp.). Connective variable interspecifically. Aedeagus symmetrical or not (varying interspecifically), with or without processes. Paraphyses present or absent, when present with the rami widely separated at their bases, or paraphysis consisting only of a broad transverse plate.

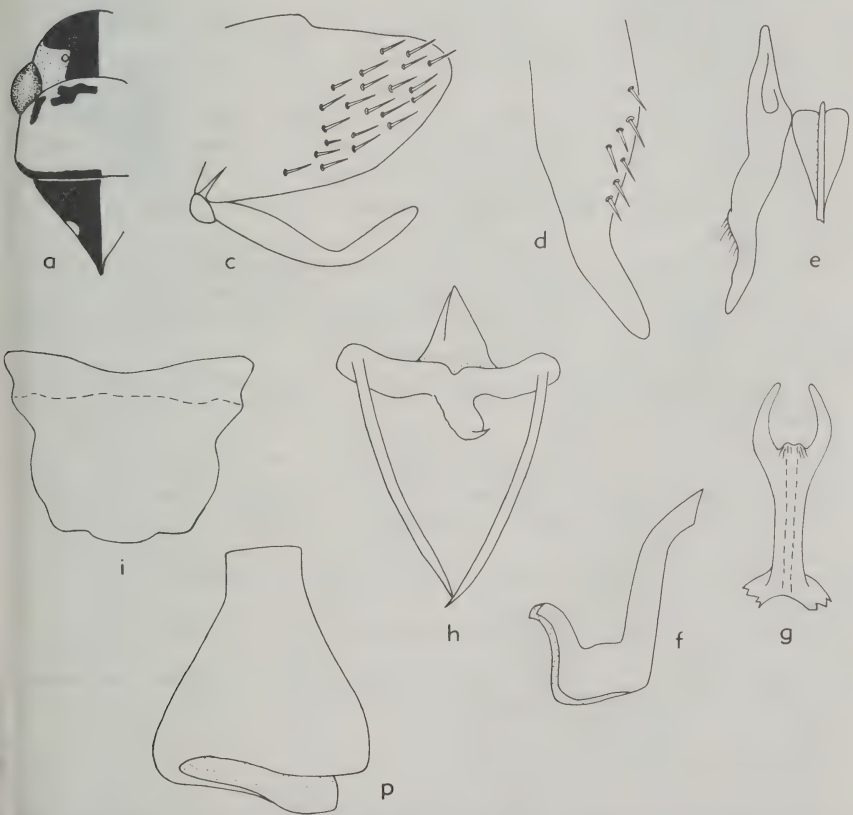


FIGURE 597.—*Pawiloma eclesia* (Melichar) (from specimens from Ecuador; *h* from dorsal view): *p*, Female abdominal sternum VII from lateral view.

Female abdominal sternum VII moderately produced with posterior margin varying interspecifically from truncate or emarginate to tapered. Ovipositor with broad, toothed area of second valvulae occurring throughout region beyond basal curvature, the primaries sloping and bearing secondary denticles, and usually with minute anteapical dorsal and ventral denticles.

Species of *Pawiloma* occur from Panama to Peru, in Venezuela, and in southern Brazil, Paraguay, and northern Argentina. The genus is similar in a number of respects to *Erythrogonia* Melichar, many species of which have the rami of the paraphyses widely separated at their bases in the males, and females in which the valvulae of the ovipositor are similar to *Pawiloma* species. There is so much variation in both genera that it is difficult to find mutually exclusive characters, but none of the species of *Pawiloma* have the distinct, discrete pale spots on either the anterior dorsum, or forewings, or both, that characterizes *Erythrogonia,* except *P. paramoena,* n. sp. The form of the female genitalia is also suggestive of a relationship with *Inuyana,* new genus, but the anal processes of the males of the latter are distinctive.

Some specimens of *Pawiloma victima* (Germar) in USNM were collected on *Persea Indica* Sprengel.

My identification of *Tettigonia amoena* Walker is based on an examination of the lectotype, as is the present identification of the synonymous *Tettigonia maculicollis* Signoret.

My interpretation of *Erythrogonia eclesia* Melichar is based on an examination of specimens in MHNP, all females, a series of females in NCS, and a single male from ZIL. No lectotype was selected earlier because I did not know whether this would duplicate a selection by Medler, whose paper was then in press.

The identification of *Cardioscarta festiva* Melichar is based on an examination of the lectotype and a dissection of a male specimen compared with it.

I have identified *Tettigonia multilunatula* Breddin in the sense of a male specimen compared with the female lectotype.

Tettigonia victima Germar is identified here in the sense of specimens identified by Signoret in NMV.

SPECIES OF *PAWILOMA*

amoena (Walker), 1851b:759 (*Tettigonia*). Colombia, Venezuela. New combination.
maculicollis (Signoret), 1855d:776 (*Tettigonia*). New synonymy.
ancora, n. sp. S. Brazil.
eclesia (Melichar), 1926a:392 (*Erythrogonia*). Ecuador. New combination.
feminina, n. sp. Ecuador.
festiva (Melichar), 1932a:319 (*Cardioscarta*). Colombia. New combination.
fulpae, n. sp. Peru.
multilunatula (Breddin), 1901e:91 (*Tettigonia*). Panama, Ecuador. New combination.
paramoena, n. sp. Colombia, Venezuela.
penancora, n. sp. SE. Brazil.
peristicta, n. sp. Colombia.
sirochia, n. sp. Peru.
victima (Germar), 1821a:68 (*Tettigonia*). S. Brazil, Paraguay, Argentina. New combination.

KEY TO SPECIES OF *PAWILOMA*

1. Color of pronotum and forewings dull red; female abdominal sternum extending ventrally from horizontal axis of abdomen
eclesia (Melichar) (fig. 597)
Color not as above; female abdominal sternum VII in plane of sterna of preceding abdominal segments 2
2. Markings including two ivory bands across the forewings at rest 3
Markings not so 4
3. Pronotum with an ivory transverse band; aedeagus with a single pair of processes ..... *fulpae*, n. sp., page 734
Pronotum without such a band; aedeagus with two pairs of processes
amoena (Walker) (fig. 599)

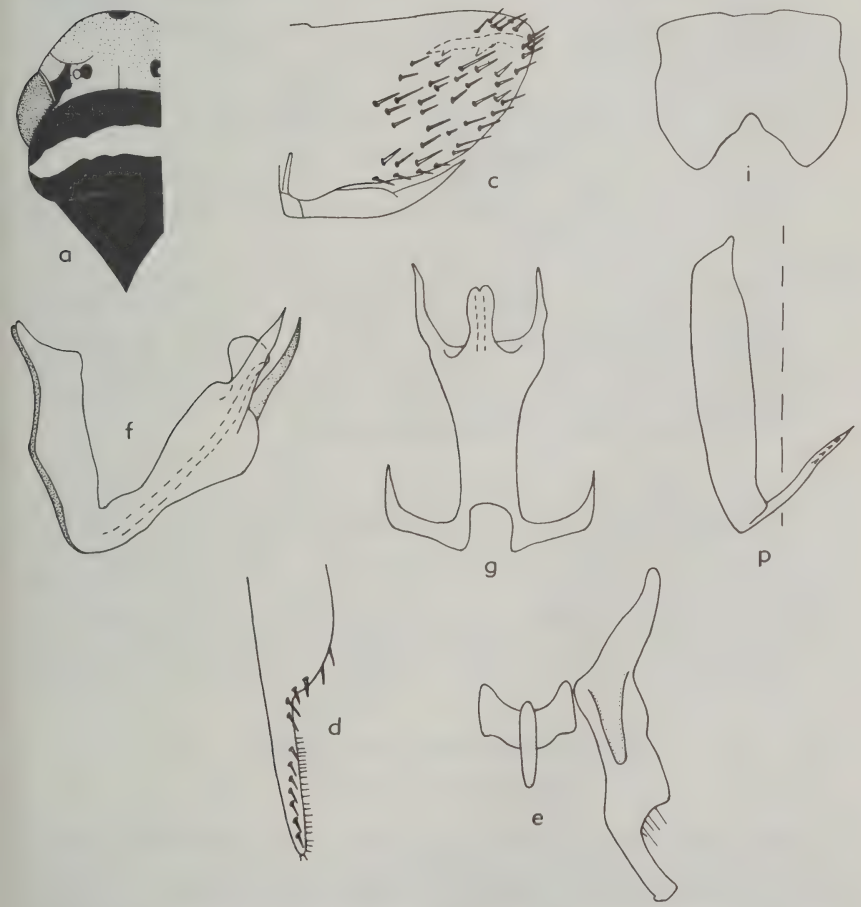


FIGURE 598.—*Pawiloma fulpae*, n. sp. (*i*, from topotype; remainder from holotype): *p*, Male pygofer apex, right side, from ventral view.

4. Forewings with numerous orange spots some of which are circular; specimens more than 9 mm long ..... *victima* (Germar) (fig. 600)
   Forewings not so; specimens less than 9 mm long 5

5. Crown with a median apical black spot 6
   Crown not so marked 7

6. Male pygofer with an apicoventral process on each side
   peristicta, n. sp., page 737
   Male pygofer without processes ..... *multilunatula* (Breddin) (fig. 602)

7. Crown dull yellow, unmarked ..... *paramoena*, n. sp., page 739
   Crown black, or red or yellow with black markings 8

8. Clavus of forewing alternating orange (or yellow) and black; male with aedeagus asymmetrical; paraphyses with paired rami
   festiva (Melichar) (fig. 596)
   Clavus of forewing not as above; male with aedeagus symmetrical; without paraphyses or with a broad platelike paraphysis 9

9. Crown and pronotum black, without markings; male without paraphyses; female abdominal sternum VII with posterior margin concave medially, the emargination bearing a process 10
   Crown and pronotum black with yellow markings or red with black markings; male with a broad platelike paraphysis; female abdominal sternum VII not as above 11

10. Forewing apices black; male styles not very slender and elongate, expanded anteapically; female with anchor-shaped process at base of emargination of abdominal sternum VII ..... *ancora*, n. sp., page 743
    Forewing apices not black; male styles very slender and elongate, not expanded anteapically; female with process at base of emargination of abdominal sternum VII not anchor-shaped
    penancora, n. sp., page 745

11. Female abdominal sternum VII with a constriction near midlength (fig. 604*i*); aedeagus with a pair of dorsal processes each of which extends laterally; crown and pronotum black, marked with yellow
    sirochia, n. sp., page 739
    Female abdominal sternum VII not constricted; aedeagus without dorsal processes; crown red marked with black, pronotum black marked with red ..... *feminina*, n. sp., page 741

Pawiloma fulpae, NEW SPECIES

FIGURE 598, PAGE 733

Length of male 8.0 mm, of female 7.7-8.3 mm. Head with median length of crown varying from more than one-half to more than six-tenths interocular width and from more than one-third to more than four-tenths transocular width. Pronotum with width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, disk weakly transversely

rugulose, scutellum not rugose; forewings very glossy, membrane not distinctly delimited, veins distinct. Pygofer moderately produced, pygofer process arising at apex, extending anteromesally, and crossing its complement at median line, macrosetae numerous, short; plates slender and triangular, narrowed near midlength; style extending posteriorly much beyond apex of connective, with a preapical lobe, apex subtruncate; connective short Y-shaped with arms widely divergent; aedeagus symmetrical, with a pair of

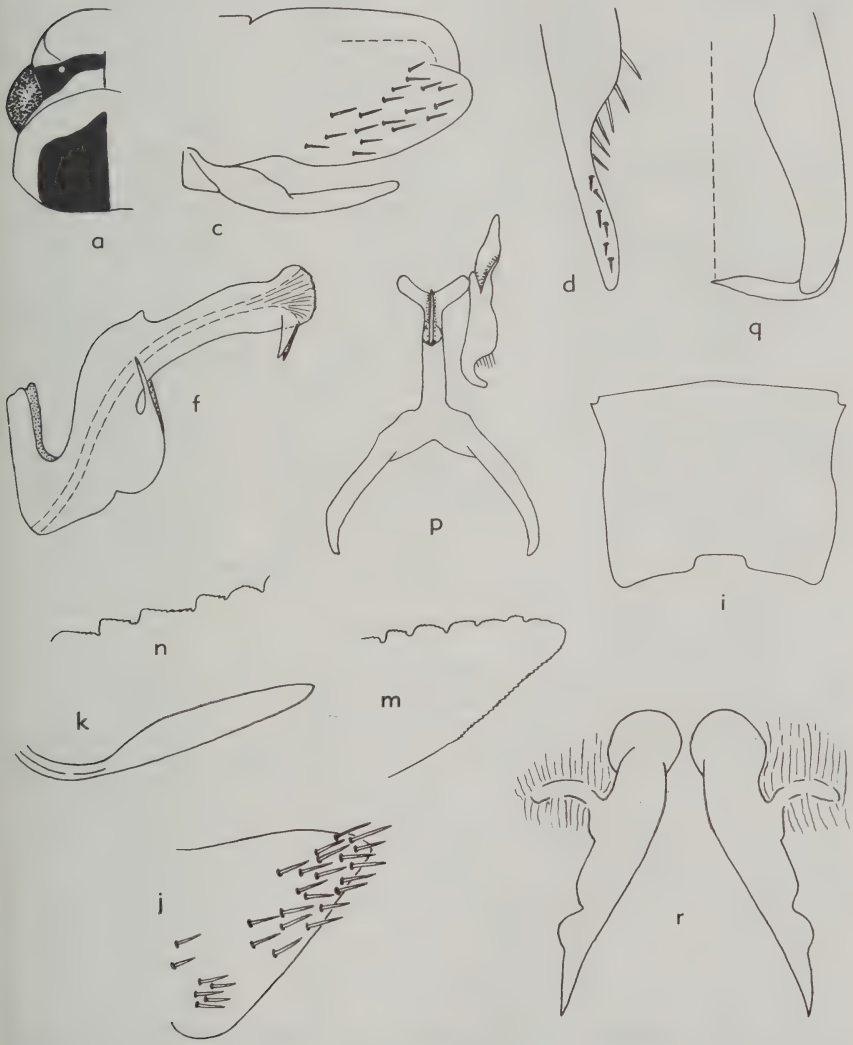


FIGURE 599.—*Pawiloma amoena* (Walker) (*i* from specimen from Venezuela; *j, k, m, n, r,* from Lara, Venezuela; remainder from Maracay, Venezuela): *p,* Style, connective and fused paraphyses, from dorsal view; *q,* male pygofer, left side, from ventral view; *r,* sclerites in dorsal wall of genital chamber.

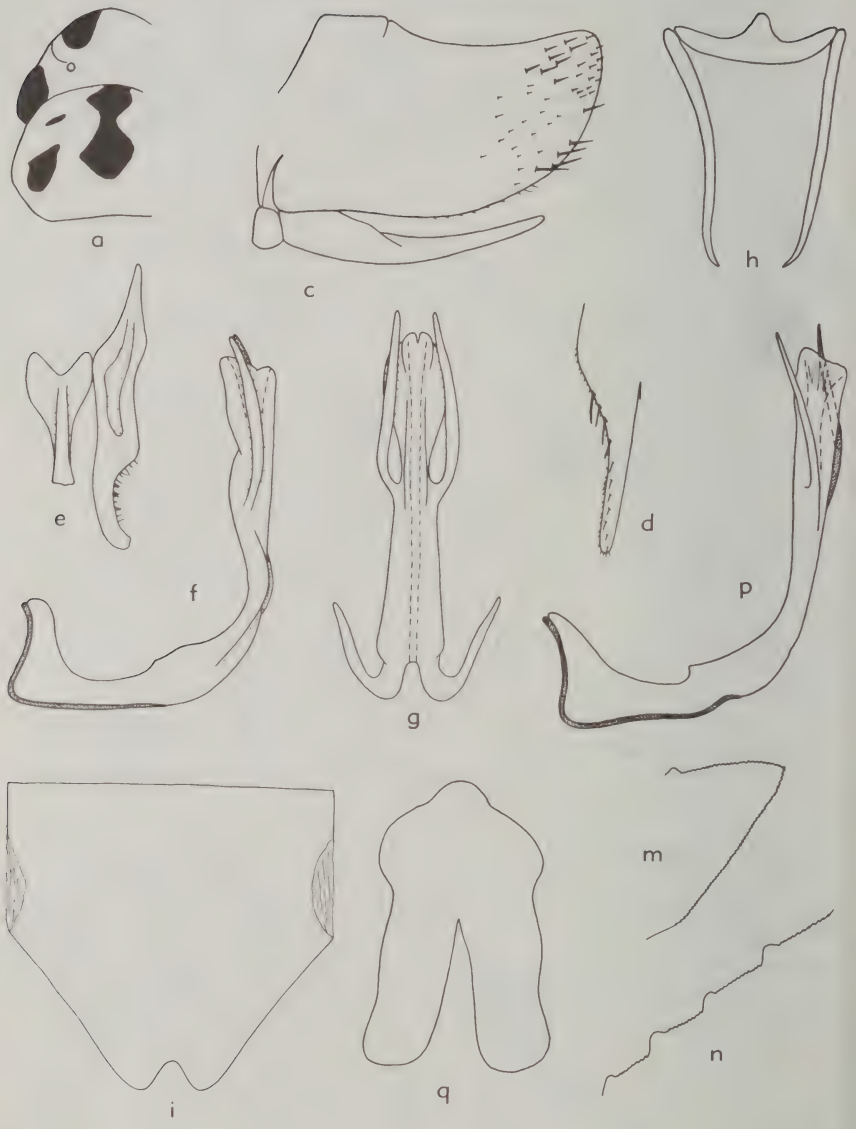


FIGURE 600.—*Pawiloma victima* (Germar) (*h*, *p*, from specimen from Buenos Aires, Argentina; *a*, *c-g*, from Pelotas, Brazil; remainder from Argentina; *h* from caudoventral view): *p*, Aedeagus from lateral view; *q*, dorsal sclerite of genital chamber.

acute anteapical lateral processes extending beyond apex of shaft, with a round dorsoapical lobe at shaft apex; paraphyses very broad at base, with a pair of short, slightly convergent rami. Female abdominal sternum VII with a median V-shaped emargination on posterior margin.

Crown orange with a black spot at apex and a transverse black mark on each side extending from a point near ocellus laterad across ocellus to inner eye margin, often interrupted; pronotum black with a transverse ivory band across middle of disk; scutellum and anterior portions of forewings a continuation of the black posterior part of pronotum, the black area delimited posteriorly by a transcommissural ivory band; midclaval area broadly and adjacent corium translucent tan, remainder of forewings black with an oblique ivory marking on each wing extending from costal margin posteromesad to claval apex; face orange with a pair of vertical black bands of variable extent on clypeus and usually with a black mid-clypellar band that is often interrupted; femora orange, remainder of legs dull brown.

Holotype male and two females, Macchu Picchu Pueblo, Cuzco, Peru, February 21, 1947, alt. 6491 ft. (J. C. Pallister); one female, same data except March 7, 1947, 9500 ft. (AMNH). Three females, Macchu Picchu, Peru, November 25, 1967 (D. M. DeLong) (DeLong collection, OSU).

This beautifully marked species is named for Miss Theresa Fulp who illustrated some of the species included in this study.

P. fulpae, n. sp., is different from other species, except *P. amoena* (Walker), for which males are known in that there is only a single pair of aedeagal processes and in the apical pygofer processes. The markings are also distinctive.

Pawiloma peristicta, NEW SPECIES

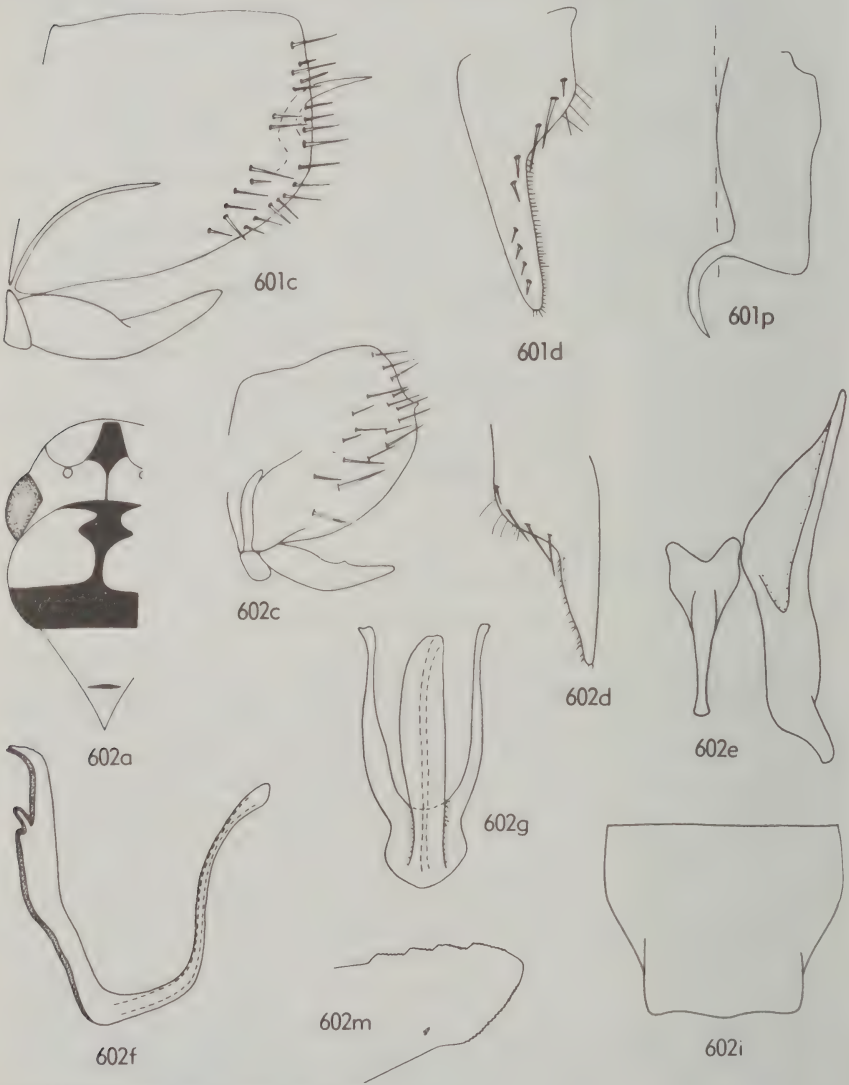
FIGURE 601, PAGE 738

Length 7.5-7.6 mm. Head with median length of crown varying from slightly more than one-half to slightly less than six-tenths interocular width and approximately four-tenths transocular width. Pronotum with width less than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae incomplete, disk of pronotum and scutellum without sculpturing; forewing with veins not distinct. Pygofer weakly produced, truncate apically, process arising lateroventrally, extending mesad and across median line then curved posteriorly, macrosetae long, restricted to posterior marginal area, plates short, abruptly narrowed near midlength; style not extending posteriorly much beyond apex of connective, without preapical lobe, apex subtruncate; connective short Y-shaped with arms widely divergent; aedeagus slender and elongate, much as in *P. multilunatula* (Breddin) (fig. 602*f*), slightly asymmetrical, without processes; paraphyses absent. Female abdominal sternum VII moderately produced with posterior margin convex.

Crown, pronotum, scutellum, and forewings, orange, a median cuneate spot at apex of crown, a median spot near anterior margin of pronotum and a transverse band near its apex, the pronotal markings usually connected by a

narrow median stripe, black; forewing with an irregular black pattern in the form of a figure "8" delimiting two commissural orange spots and with a lateral extension of each loop of the "8" to the adjacent costal wing margin, and each wing with an additional black oblique vitta extending from humeral margin to costa; face, thoracic pleura and legs orange.

Holotype and one additional male and two females, Colombia, 1942 (L. Richter) (NCS). Holotype on indefinite loan to USNM.



FIGURES 601, 602.—601, *Pawiloma peristicta*, n. sp., holotype: *p*, Male pygofer, left side, from ventral view. 602, *P. multilunatula* (Breddin), from specimens from Panama.

P. peristicta, n. sp., is very closely related to *multilunatula,* from which it may be distinguished by the presence of the pygofer process in the male and by the different setal pattern of the pygofer. The plates of *multilunatula* have a prominent dorsal angularity which is smaller and located more proximally in *peristicta.* I cannot separate the species without dissection.

Pawiloma paramoena, NEW SPECIES

FIGURE 603, PAGE 740

Length 9.3-9.5 mm. Head with median length of crown varying from slightly less than one-half to almost six-tenths interocular width and from one-third to almost four-tenths transocular width. Pronotum with width equal to or greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, disk not sculptured, scutellum not rugose; forewing with apical membrane distinct, including all of apical cells and small apical portions of inner two anteapical cells, veins not very distinct. Pygofer short, posterior margin with a concavity, without processes, macrosetae numerous, of several sizes; plates short, each with an angular protuberance beyond midlength; style extending posteriorly much beyond apex of connective, without a preapical lobe, apex tapered and narrowly rounded; connective short Y-shaped, with arms not very widely divergent; aedeagus symmetrical, with a pair of near-apical widely diverging processes; paraphyses with rami slender, elongate, tapering to acute apices, widely separated at base. Female abdominal sternum VII with posterior margin truncate.

Crown and pronotum sordid yellow to dull whitish; scutellum yellow with basal angles usually purple; forewings purple with three large spots on each wing, the anteriormost extending across brachial cell and including part of basal half of clavus, the middle one on corium opposite apical half of clavus (holotype) or extending across claval suture and including part of clavus, the apical spot narrower and extending across a portion of the anteapical cells; face, thoracic pleura, and wings, yellow.

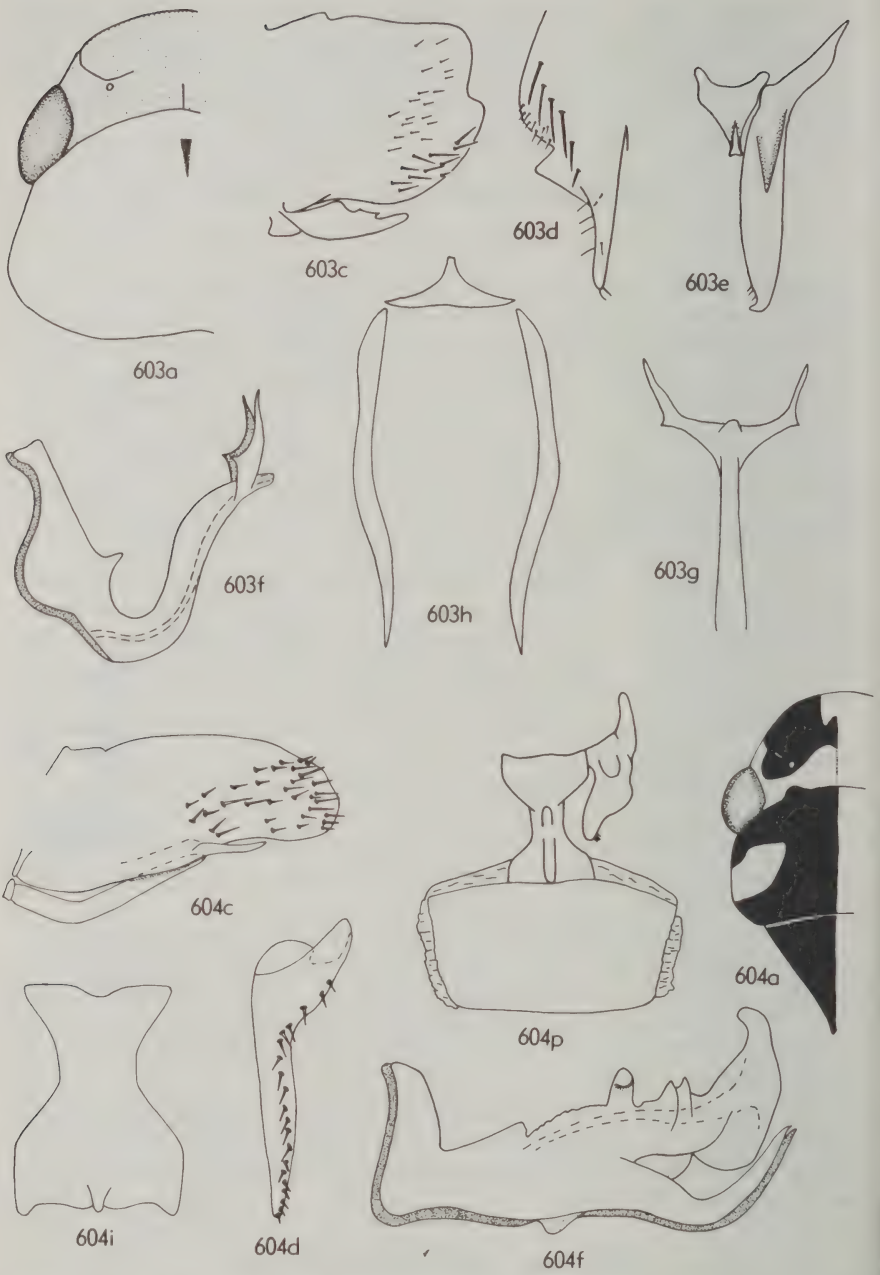
Holotype male and one female, Colombia, 1942 and 1941 respectively (L. Richter) (NCS). One female, Bogotá, Colombia (RMS). One female, E. Mérida, Acequias, Venezuela, 8000 ft. October 16, 1938 (J. Hanbury Tracey), BM 1939-117; and one female, Mérida, Río "Albaregas", Venezuela, 8000 ft., February 9. 1939 (J. Hanbury Tracy [sic]), BM, 1939-270 (BM). Holotype on indefinite loan to USNM.

The large spots on the forewing, although variable in size, are distinctive for *P. paramoena,* n. sp. The emarginate posterior pygofer margin will separate the males from those of *P. festiva* (Melichar) to which *paramoena* is closer than to other species in the genus.

Pawiloma sirochia, NEW SPECIES

FIGURE 604, PAGE 740

Length 7.7-8.0 mm. Head with median length of crown varying from slightly less than six-tenths to seven-tenths interocular width and from slightly



FIGURES 603, 604.—603, *Pawiloma paramoena*, n. sp., holotype (only aedeagal shaft shown in *g*, *h* from ventral view). 604, *P. sirochia*, n. sp., holotype; *p*, Style, connective, and paraphysis, from dorsal view.

more than one-third to more than four-tenths transocular width. Pronotum with width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae incomplete, disk transversely rugose, scutellum rugose behind transverse depression; forewings each with posterior half, or more, membranous, but with membranous area not sharply delimited anteriorly, veins distinct. Pygofer moderately produced, pygofer process short, slender, arising ventrally, extending posterodorsally, macrosetae numerous, varying in size, located on posterior half of disk; plates slender and triangular, narrowed near base; style short, with a preapical lobe, apex narrowly rounded; connective Y-shaped, fused apically with paraphysis; aedeagus symmetrical, with a pair of slender curved processes arising on base of shaft, extending as far as apex of shaft, a pair of dorsal processes near midlength of shaft, each extending laterad, a transverse anteapical groove located dorsally on shaft, and a dorsal lobe at apex of shaft; paraphysis a broad flat plate without rami. Female abdominal sternum VII constricted at midlength, keeled medially, the keel extending to a short apical tooth, posterior margin transversely rectilinear on each side of median tooth.

Crown black with a pair of small apical spots or a single apical spot, a basal transverse line extending from eye to eye and antennal ledges, yellow, the last in some specimens connected to the basal coronal band by a yellow line parallel to inner eye margin; pronotum black with transverse ovate spot extending slightly anteromesad from lateral margin on each side, yellowish-green; scutellum black; forewing with costal area broadly black near base, adjoining a longitudinal yellowish-green band that is evanescent posteriorly, clavus and remainder of corium smoky subhyaline; face yellow with a broad Y-shaped black mark with its arms on clypeus and its base on midclypellus; propleura black; legs yellow to pale brown except a broad anteapical black band on posterior femur.

Holotype and one additional male and two females, 30 mi. northeast of Huánuco, Peru, 2500 m., September 17, 1954 (E. S. Ross and E. I. Schlinger) (CAS).

P. sirochia, n. sp., is closely related to *P. feminina,* n. sp. (below), but can be readily separated by the differences in the aedeagus of the male, and by the constricted abdominal sternum VII of the female.

Pawiloma feminina, NEW SPECIES

FIGURE 605, PAGE 742

Length 8.1-8.5 mm. Head with median length of crown from slightly less than six-tenths to slightly greater than six-tenths interocular width and slightly more than four-tenths transocular width. Pronotum with width less than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae incomplete, pronotum and scutellum without rugae; forewing with apical cells mostly membranous but membrane not abruptly delimited, veins distinct. Male pygofer as in *P. sirochia,* n. sp., but narrower at apex; plates as in *sirochia;* style very short, not extending as far posteriorly as apex

of connective, with preapical lobe, angular at apex; connective short Y-shaped; aedeagus symmetrical, with a pair of lateroventral processes arising at base of shaft, extending parallel to shaft almost to its apex and acute apically, and a pair of lateral processes arising near base of shaft, curving posterodorsally and acute apically; paraphyses in form of a long transverse bar with an angular posterior projection at each extremity. Female abdominal sternum VII with a median keel produced apically to a short tooth at middle of transverse posterior margin.

Crown orange with a pair of anterolateral large black marginal spots and a small median apical black spot. Pronotum and scutellum black with a pair of oval spots on each side at midlength; forewings translucent tan with costal and commissural margins black; face orange with a broad Y-shaped black marking laterally on clypeus and medially on clypellus; propleura black; femora of fore- and middle legs and knees of hindlegs, orange, remainder brown.

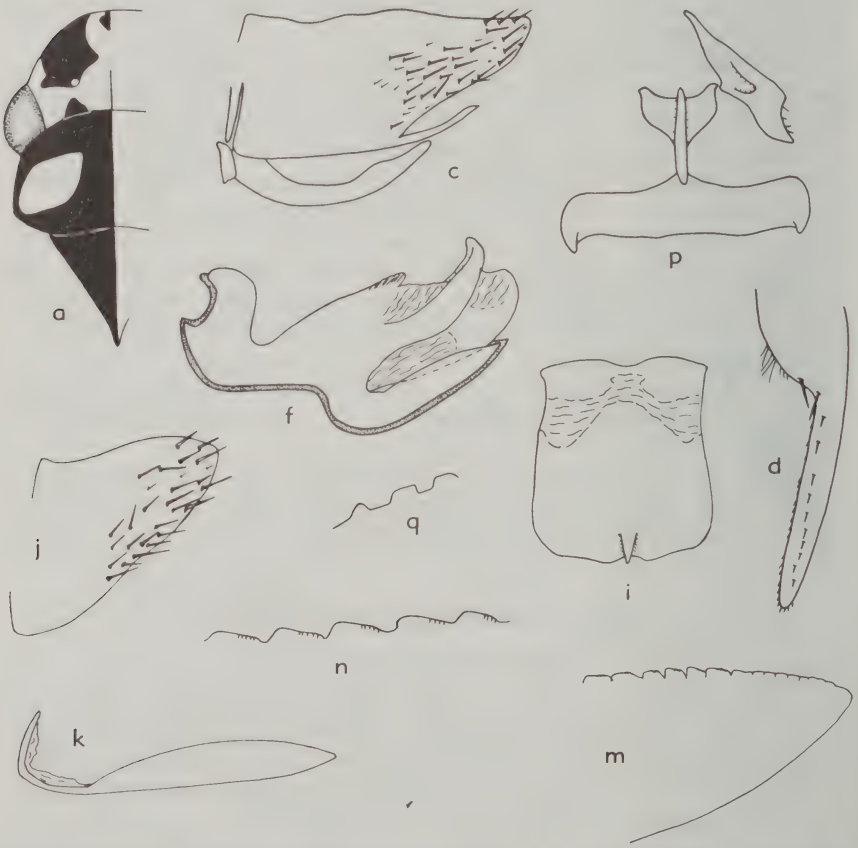


FIGURE 605.—*Pawiloma feminina*, n. sp., (*a, c, d, f, p*, from holotype; remainder from topotype): *p*, Style, connective, and paraphysis, from dorsal view; *q*, basalmost teeth of ovipositor.

Holotype and nine additional males and four females, and one specimen without abdomen (one pair of these *in copula*), Baños, Ecuador, 2500 m., May 25 (4 males and 3 females) and May 6, 1939 (remainder) (W. Clark-Macintyre); one female, same data except January 9, 1939, 3000 m.; three males and two females, same data except January 9, 1939, 1800 m. (NCS). Holotype on indefinite loan to USNM.

P. feminina, n. sp., is closely related to *P. sirochia,* n. sp., in the discussion of which distinguishing characters are treated.

Pawiloma ancora, NEW SPECIES

FIGURE 606

Length of male 8.3-9.1 mm, of female 9.3-9.7 mm. Head with median length of crown from slightly more than four-tenths to slightly more than one-half interocular width and from one-fourth to one-third transocular width;

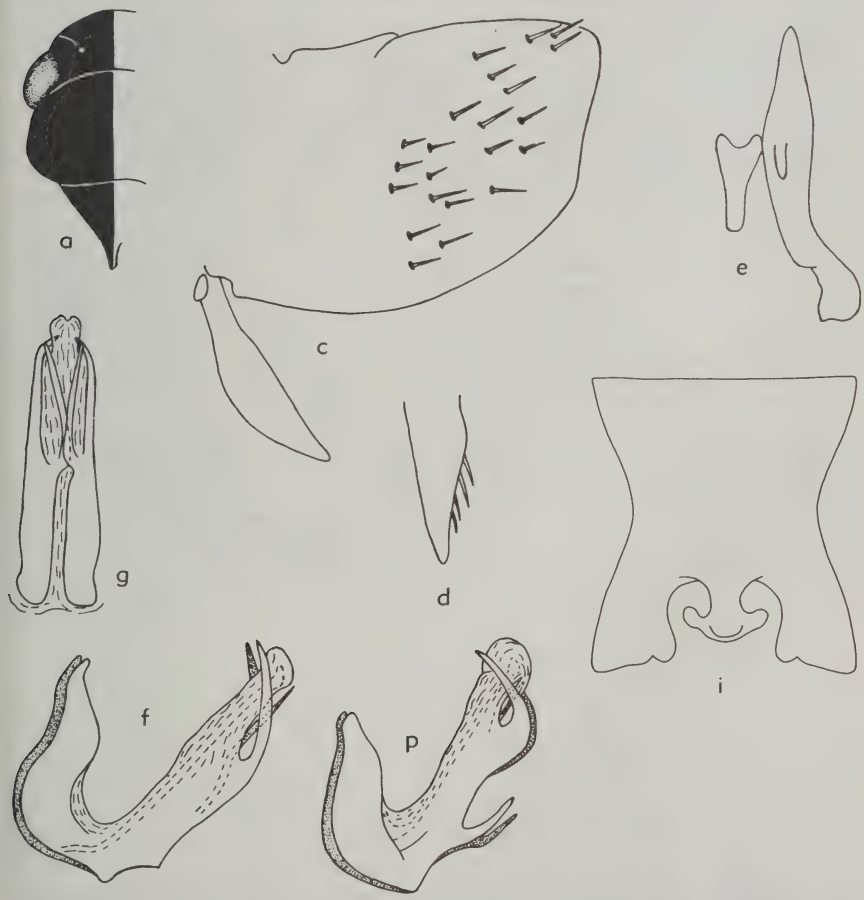


FIGURE 606.—*Pawiloma ancora,* n. sp. (*i* from topotype; *p* from specimen from São Paulo, Brazil; remainder from holotype): *p,* Aedeagus from lateral view.

ocelli each slightly closer to adjacent anterior eye angle than to median line of crown. Pronotum with width less than transocular width of head, lateral margins parallel, disk weakly transversely rugulose, scutellum without rugae; forewing with membrane abruptly delimited basally, including apical and greater part of anteapical cells. Male pygofer with posterior margin truncate, plates very short, triangular, gradually tapering; style extending posteriorly well beyond apex of connective, without preapical lobe, broader and truncate apically; connective short and narrowly Y-shaped, with arms not widely divergent; aedeagus symmetrical, with a pair of branched ventral processes near midlength, and with or without a pair of short ventral processes near base; paraphyses absent. Female abdominal sternum VII with a truncate lobe on each side of a median concavity that bears an anchor-shaped projection.

Crown, pronotum, scutellum, and apices of forewings, black, remainder of forewings red; face black except a pale spot beneath each eye; thoracic pleura varying from entirely black to partly pale; legs tan, partly suffused with black in some specimens.

Holotype male, Ilha Grande, Brazil, December 12, 1893 (H. Brauns) and one female same data except date: October 7, 1893; one female, Minas Gerais, 1897, ex. coll. Fruhstorfer, (all det. as *rutilans* Walker by Melichar) (ZIMH). One male, same data as last of preceding (HNHM). One female, Espírito Santo [Brazil] (RMS). Three males, Ubatuba, São Paulo, Brazil, August 24, 1965 (C. A. Triplehorn) (OSU).

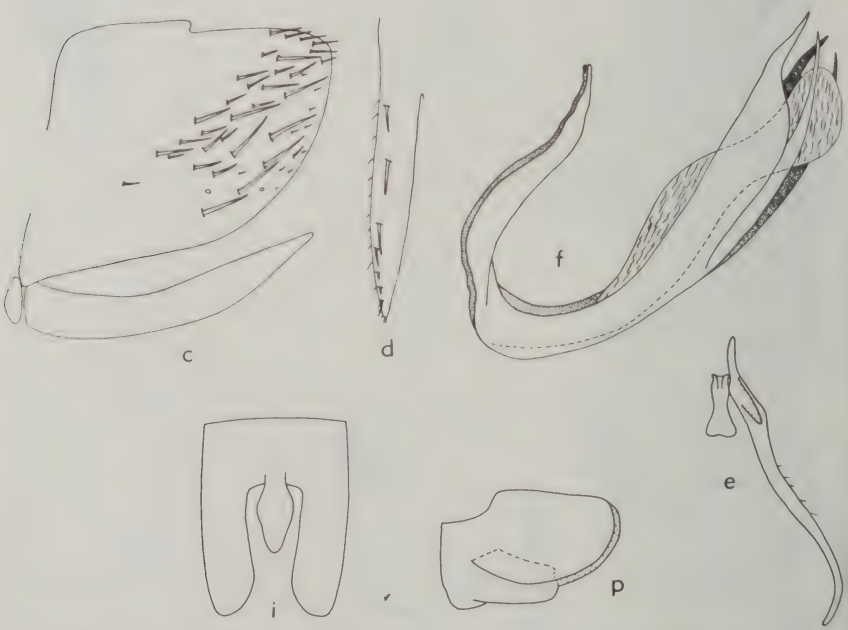


FIGURE 607.—*Pawiloma penancora*, n. sp. (*i*, *p*, from topotype; remainder from holotype): *p*, Abdominal sternum VII of female, from lateral view.

P. ancora, n. sp., is closely related to *P. feminina,* n. sp., in the form of the aedeagus. It lacks a paraphysis which is distinct in *feminina* males. The form of the female abdominal sternum VII is unique. *P. ancora* is similar in appearance and in color to *Caragonalia carminata* (Signoret) and *C. tarsalis* (Signoret).

Pawiloma penancora, NEW SPECIES

FIGURE 607, PAGE 744

Length of male 9.3-9.6 mm, of female 9.7-10.4 mm. Head with median length of crown slightly less than four-tenths to slightly greater than four-tenths interocular width and approximately one-fourth transocular width; ocelli closer to adjacent anterior eye angle than to median line of crown. Pronotum with width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, disk transversely rugulose, scutellum transversely rugulose behind transverse sulcus; forewing with membrane abruptly delimited basally, including apical cells and small distal portion of some anteapical cells. Male pygofer with posterior margin broadly convex, plates longer than in *P. ancora,* n. sp., narrowly triangular, gradually tapering; style very slender and elongate, extending posteriorly much beyond apex of connective, narrowly rounded apically; aedeagus symmetrical, with pair of branched processes arising near midlength, all of the rami extending beyond apex of membranous shaft. Female abdominal sternum VII with a deep median emargination that bears a median lobate projection (appearing as a separate, black, triangular sclerite in dried specimens).

Color of anterior dorsum and forewings as in *ancora* except that forewing apices are not black apically; face with clypeus and clypellus black, genae and lora pale; thoracic pleura pale except black mesepisternum; legs red except posterior tibiae and tarsi which are brownish.

Holotype and one additional male and five females, Espírito Santo, Brazil (MMB). Four females, Espírito Santo, Brazil (MHNP). One female, Espírito Santo, Brazil (HNHM). One female, Espírito Santo, Brazil (ZIL). One female, Santa Catharina, Brazil (RMS).

P. penancora, n. sp., is similar in appearance to *P. ancora,* n. sp., but differs markedly in the genitalia of both the male and the female.

97. NANNOGONALIA, NEW GENUS

FIGURE 608

Type-species: *Tettigonia circumcincta* Signoret (1855d:775).

Length of female 9.1-9.5 mm.

Head moderately produced, median length of crown approximately six-tenths interocular width and approximately four-tenths transocular width, anterior margin varying from broadly rounded to parabolic in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to

median line of crown, disk with or without a transverse concavity before ocelli, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledge with anterior margin oblique and slightly convex in lateral view; face convex, without pubescence, muscle impressions not distinct, transclypeal suture interrupted medially, clypellus in profile continuing contour of clypeus.

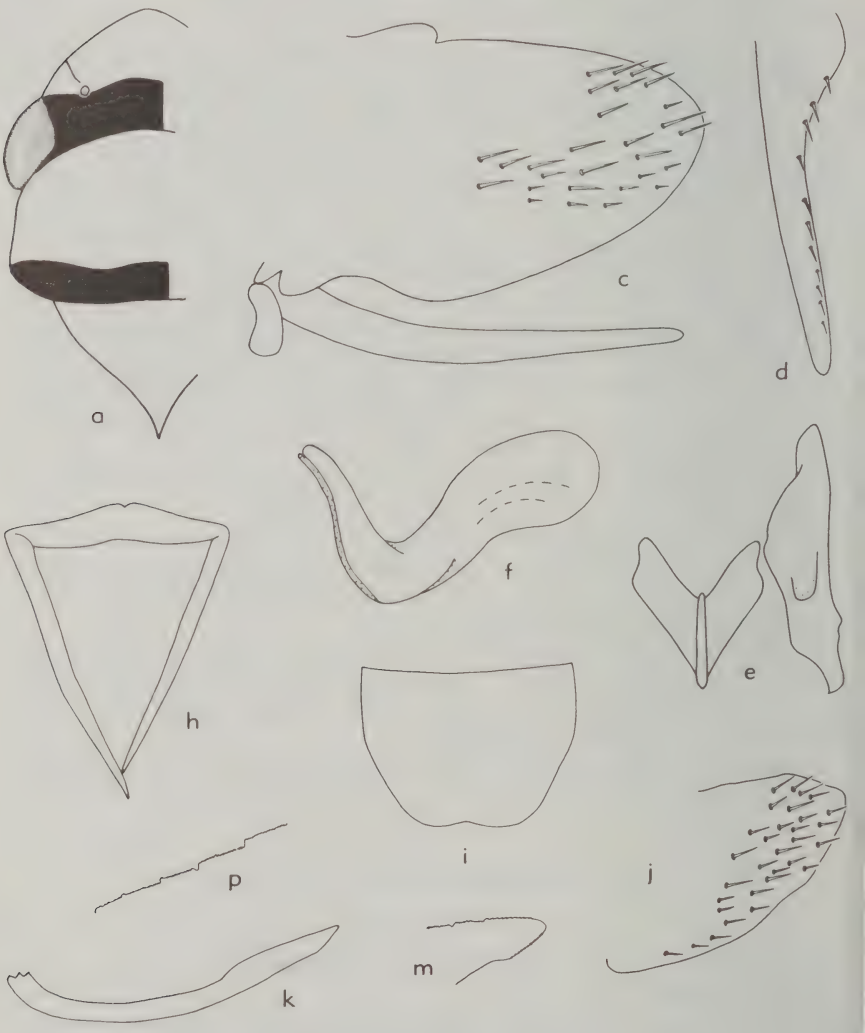


FIGURE 608.—*Nannogonalia circumcincta* (Signoret) (*a* from specimen from Corupa, Brazil; *i-k*, *m*, *p*, from Santa Catharina, Brazil; remainder from lectotype; *h* from dorsal view): *p*, Basalmost teeth of second valvula.

Thorax with pronotal width approximately equal to transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete and slightly oblique, posterior pronotal margin very slightly concave, disk of pronotum and posterior portion of scutellum without sculpturing. Forewing with inner two apical cells membranous, veins not distinct, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture opaque, wings of female at rest exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length greater than combined length of second and third, with two rows of small microsetae.

Male genitalia: Pygofer moderately produced, regularly convex apically, with a number of macrosetae on upper portion of posterior half, without processes. Plates extending posteriorly as far as pygofer apex, slender, triangular, with short uniseriate macrosetae. Style short, extending posteriorly as far as apex of connective, narrowed apically and with apex acute. Connective V-shaped, with a median keel. Aedeagus short, broad, convexly rounded apically, without processes. Paraphyses consisting of a broad transverse basal piece and two slender convergent rami.

Female abdominal sternum VII moderately produced, posterior margin slightly convex on each side of a slight median concavity. Genital chamber with two weakly sclerotized areas on dorsal wall. Ovipositor with second valvulae broadened only in apical third, the broad portion bearing weak convex primary teeth each bearing minute secondaries, with posterodorsal and posteroventral anteapical denticles. Pygofer with numerous macrosetae of mixed size on posterior half and extending anteroventrally along posteroventral margin.

Nannogonalia, new genus, is known only from the type-species, from Brazil, and probably restricted to southern Brazil. It is a handsome species, with a yellow head and pronotum and the dark band at the base of the crown continuing completely around the face. The forewings are castaneous with yellow markings: an oblique spot in basal half crossing the claval suture, a curved transverse band across the claval apex and a spot across the bases of the outer apical cells.

I have placed *Nannogonalia* close to *Pawiloma*, new genus. The male plates are longer in relation to the pygofer apex in *Nannogonalia*, and the reduced toothed area of the second valvula of the ovipositor is distinctive.

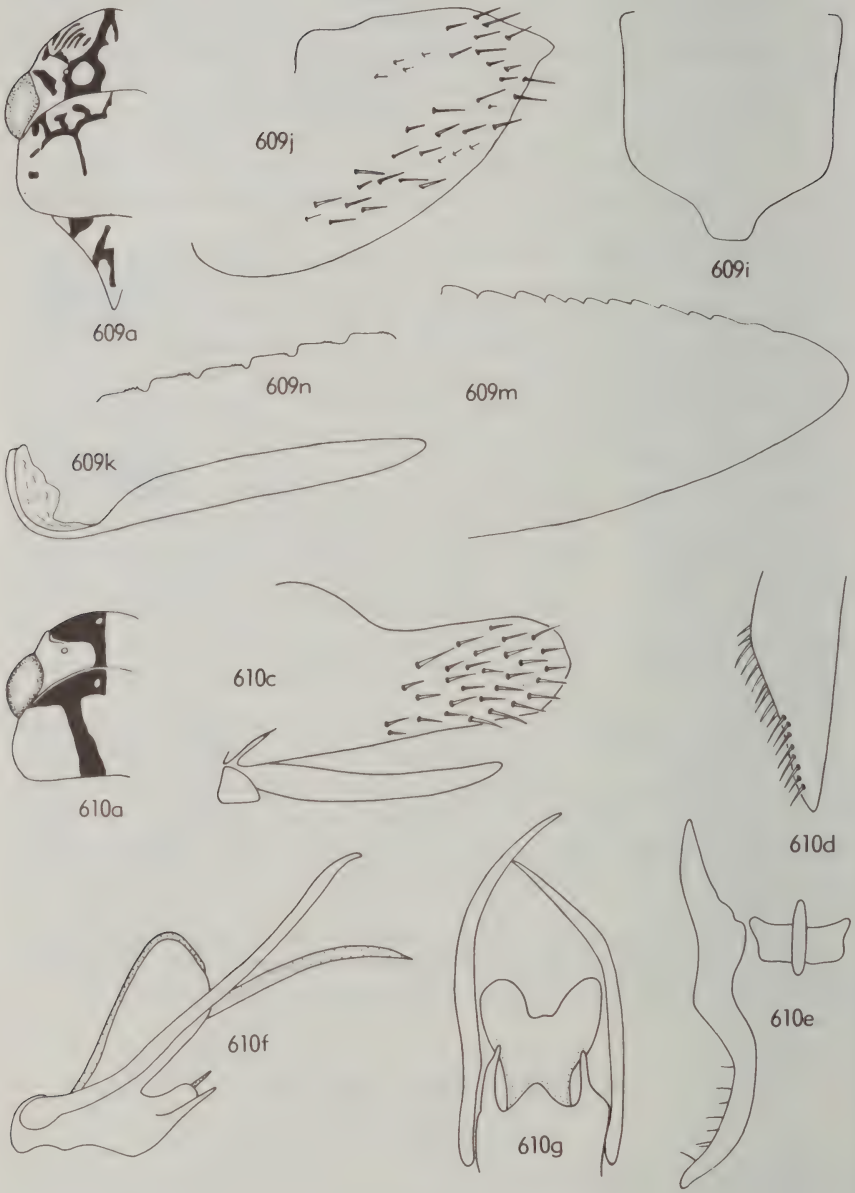
98. RUPPELIANA, NEW GENUS

FIGURES 609-617

Type-species: *Tettigonia signiceps* Stål.

Length 9.2-10.8 mm.

Head slightly to moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than four-tenths to slightly more than one-half interocular width and from three-tenths



FIGURES 609, 610.—609, *Ruppeliana signiceps* (Stål) (*a* from lectotype; remainder from specimen from Rio de Janeiro, Brazil). 610, *R. coronata* (Signoret) (from specimen from Brazil).

to slightly more than one-third transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle or closer to latter, crown without a transverse concavity across ocelli, without a median fovea, surface of crown without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with their anterior margins oblique and slightly convex; clypeus from slightly to strongly convex, muscle impressions distinct, clypellus with contour of its lower portion slightly more nearly horizontal than remainder of profile of face.

Thorax with pronotal width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin shallowly concave, disk without sculpturing, not pubescent; scutellum not transversely striate behind transverse sulcus. Forewing with membrane including all of inner apical cell and at least apical portions of adjoining apical cells, veins not elevated, distinct or not in color from remainder of wing surface, with three anteapical cells of which bases are variable interspecifically with respect to apex of clavus; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere slightly greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

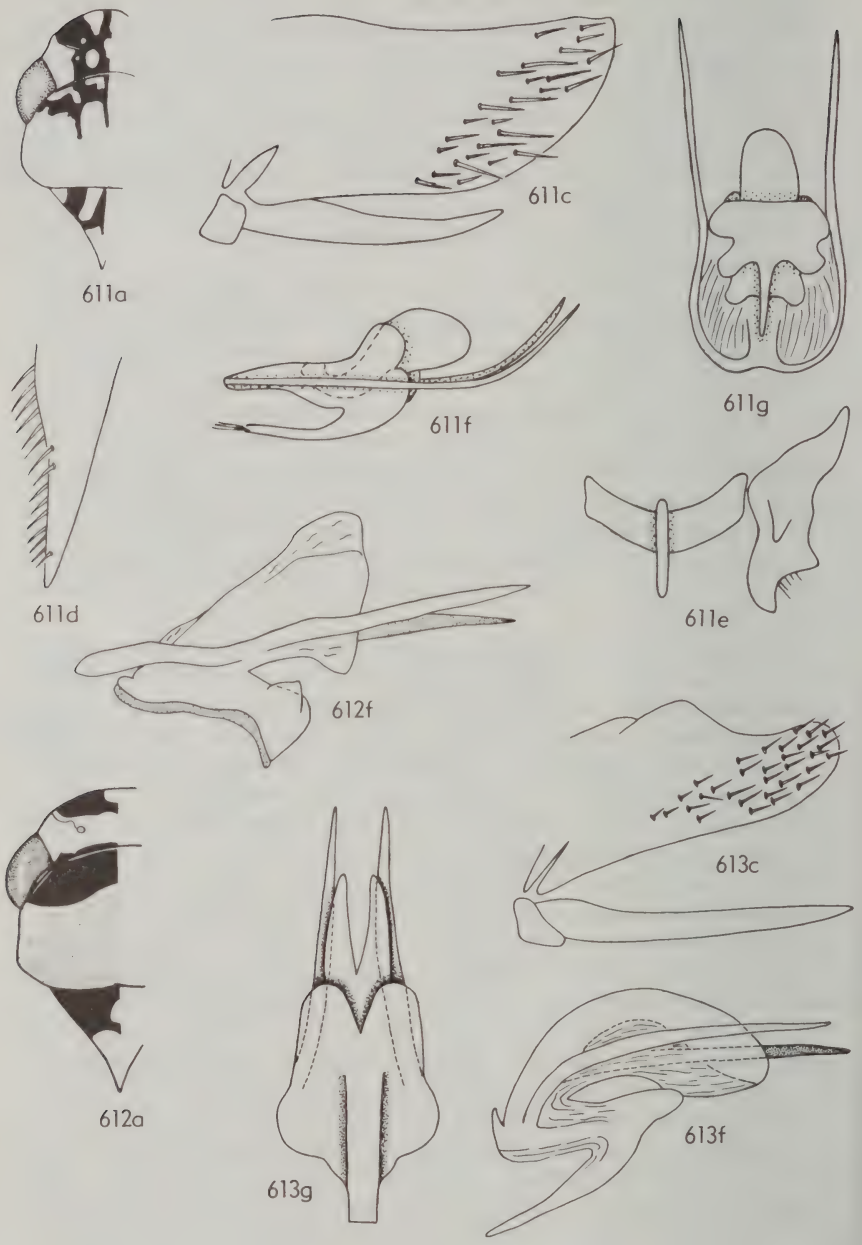
Male genitalia: Pygofer strongly produced posteriorly, posterior margin variable but not angular, with numerous macrosetae on apical half; pygofer processes absent. Plates slender and triangular, gradually tapering, extending posteriorly almost or entirely as far as pygofer apex, each with irregularly biseriate macrosetae (exception: *R. glaucomaculata* (Germar)). Style extending posteriorly beyond apex of connective, narrowly rounded apically, with or without preapical lobe. Aedeagus usually with a sheathlike basal portion which bears a pair of basidorsal long slender processes that exceed shaft apex and often a pair of short ventral processes at apex of sheath; shaft directed posterodorsally or curved posteroventrally. Paraphyses absent.

Female abdominal sternum VII weakly produced and truncate or concave medially; second valvulae of ovipositor slender, each with ventral margin slightly concave, bearing teeth on dorsal margin throughout portion beyond basal curvature, the primaries very broad basally, becoming progressively smaller towards apex and with secondary denticles on some of them (fig. 609), apex narrowly rounded; pygofer strongly produced, or narrowly rounded apically, with numerous macrosetae on apical half.

I am pleased to name this genus in honor of Dr. Robert F. Ruppel whose collecting activities in Colombia resulted in specimens useful to this study.

Ruppeliana, new genus, is restricted to southern Brazil and northern Argentina. The genus is similar in structure of both male and female genitalia to *Pawiloma,* new genus, from which it can be readily distinguished by the elongate basal aedeagal processes of the male.

Specimens of *Ruppeliana* are scarce in collections. I have seen less than a dozen specimens, other than the types illustrated here, and the new species



FIGURES 611-613.—611, *Ruppeliana coronulifera* (Stål), lectotype. 612, *R. episcopalis* (Signoret) (from specimen from Independencia, near Petropolis, Brazil). 613, *R. fulva* (Taschenberg), holotype.

described below. For that reason, and because the degree of resemblance is close among some of the species, I have not attempted a key to species, nor added to the synonymy. The list of species, below, includes all of the nominal species known to the writer. I have described a new species, because it is quite distinct from other species of the genus.

The basis of the present interpretation of *Tettigonia coronata* Signoret is a study of a male specimen (fig. 610) in the Signoret collection at NMV. The specimen agrees with the original illustration, but is not eligible as a lectotype, which should be selected from material from the Germar collection. This species is very close to, and possibly identical to *R. episcopalis* (Signoret) (see below).

I have studied the lectotype of *Tettigonia coronulifera* Stål (fig. 611).

A dissection of a male compared with the female lectotype in NMV is the basis for placing *Tettigonia episcopalis* Signoret in *Ruppeliana*. The male genitalia were very close to the present illustration of *coronata* (fig. 610) although there were external differences.

My identification of *Tettigonia fulva* Taschenberg is based on a study of the male holotype from HS. Except for the pygofer and aedeagus (fig. 613), the genitalia are like those illustrated here for *R. coronata* (Signoret) (fig. 610).

My identification of *R. glaucomaculata* (Germar) is based on specimens in BM.

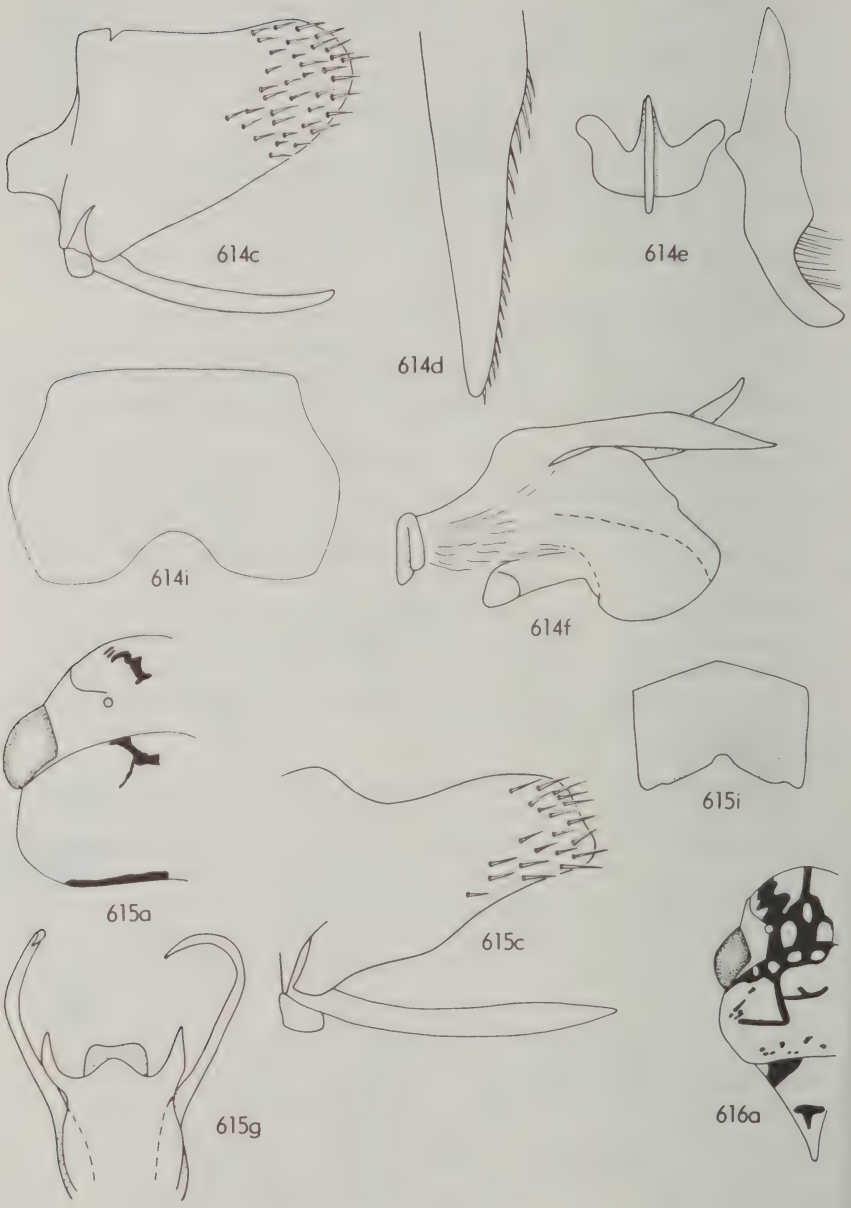
I illustrated (fig. 615) the anterior dorsum and abdominal sternum VII of the female lectotype of *Tettigonia nigripes* Signoret. Later, in MHNP, I found a male, determined by Melichar, which seemed to agree with my illustration and with the original illustration (which I had noted as good, in Vienna). The genitalia were close to my illustration of *coronata* (fig. 610) except for the pygofer (fig. 615*c*).

The present interpretation of *Tettigonia signiceps* Stål rests on the female lectotype, the only specimen, in RMS. It is a teneral specimen and I did not illustrate abdominal segment VII which was folded. The anterior dorsum (fig. 609*a*) leaves little doubt that it is properly placed in *Ruppeliana*.

Of two specimens of *Tettigonia hieroglyphica* Taschenberg loaned to me by Martin Luther University (HS), only one, without an abdomen, agreed with the original description. This specimen, the holotype, is illustrated here (fig. 616).

SPECIES OF *RUPPELIANA*

coronata (Signoret), 1853b:348 (*Tettigonia*). Brazil. New combination.
coronulifera (Stål), 1862e:39 (*Tettigonia*). Brazil. New combination.
episcopalis (Signoret), 1853b:332 (*Tettigonia*). Brazil. New combination.
fulva (Taschenberg), 1884a:442 (*Tettigonia*). Brazil. New combination.
glaucomaculata (Germar), 1821a:65 (*Tettigonia*). Brazil. New combination.
nigripes (Signoret), 1853b:370 (*Tettigonia*). Brazil. New combination.
signiceps (Stål), 1862e:39 (*Tettigonia*). S. Brazil. New combination.
taschenbergi (Berg), 1899b:160 (*Tettigonia*) (new name). Brazil. New combination.
hieroglyphica (Taschenberg), 1884a:442 (*Tettigonia*) (preoccupied).
tatia, n. sp. Brazil.



FIGURES 614-616.—614, *Ruppeliana glaucomaculata* (Germar) (*i* from specimen from southern Brazil; remainder from Brasilia). 615, *R. nigripes* (Signoret) (from specimens from Brazil; base of aedeagus not shown in *g*). 616, *R. taschenbergi* (Berg), holotype.

Ruppeliana tatia, NEW SPECIES

FIGURE 617

Length 8.7-10.0 mm. Head moderately produced, median length of crown approximately one-half interocular width and slightly less than three-tenths transocular width, ocelli each equidistant from median line of crown and adjacent anterior eye angle, clypeus slightly flattened medially. Thorax with lateral pronotal margins parallel or slightly convergent anteriorly, forewing with membrane including inner apical cell and apical portions of remaining apical cells, veins indistinct, bases of anteapical cells opposite apex of clavus. Pygofer well produced, obliquely truncate at apex, with a number of macrosetae in an irregular pattern on posterior half; plates extending posteriorly almost as far as pygofer apex; style extending posteriorly well beyond apex of connective, rounded apically, without preapical lobe; connective Y-shaped; aedeagus without basal sheathlike portion, elongate, curved slightly and gradually ventrad, with a pair of slender tapering curved processes arising ventrally on atrium and extending across shaft in lateral view and posteriorly above apical portion of shaft almost to its apex, and a pair of more slender tapering acute processes arising dorsally at base of shaft, crossing the above pair near their bases and extending parallel to ventral margin of shaft almost to its apex. Female abdominal sternum VII transverse, slightly concave medially (ovipositor not dissected). Other structural characters as in generic description.

Crown black with a broad ivory spot on each side at base, including ocelli and extending forward on antennal ledges, and a pair of small ivory spots at

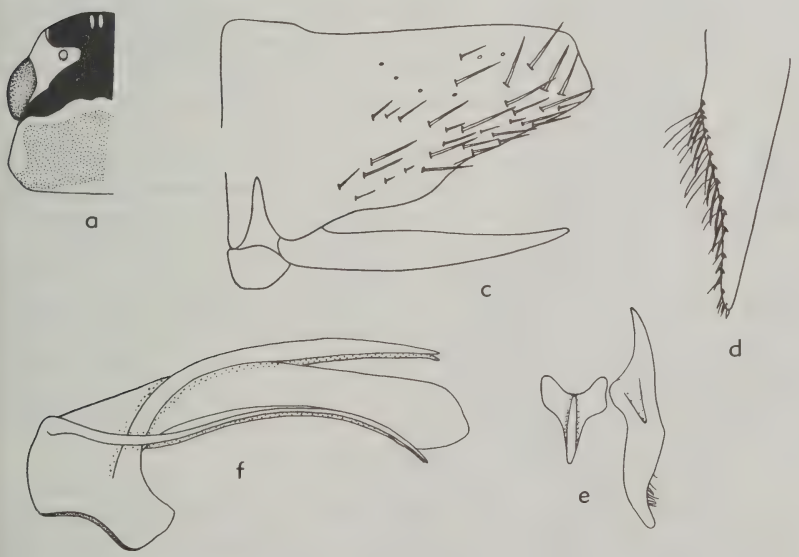


FIGURE 617.—*Ruppeliana tatia,* n. sp., holotype.

apex; pronotum with a black band at anterior margin, remainder ivory suffused with purple or brown; scutellum dull yellow with at least the basal angles black; forewing dull red with two pale spots in basal half of clavus, and three pale spots in corium: at base, opposite midlength of clavus, and in anteapical cells; clypeus with a broad black stripe continued through clypellus as a narrow median black stripe, remainder of face and thoracic pleura dull yellow; legs tan to purple.

Holotype and one additional male, Itaitaia [Itataia?], "800 MS, 12-9-33" (S. Lopes and R. Cun[ ]a) (USNM). One female, Brazil (F. Sahlb.). One male, Petropolis, Brazil (F. Sahlberg) (MMB).

R. tatia, n. sp. is closely related to *R. glaucomaculata* (Germar) from which it may be distinguished readily by its longer, more slender aedeagus, and by the form of the aedeagal processes.

99. CINEROGONALIA, NEW GENUS

FIGURE 618

Type-species: *Cicadella lituriceps* Osborn (1926b:180).

Length of male 6.4-6.7 mm, of female 6.9-7.2 mm.

Head slightly produced with anterior margin broadly convex, median length of crown from slightly less than one-half to six-tenths interocular width and from three-tenths to slightly less than four-tenths transocular width, without a carina at transition from crown to face, ocelli located in line with anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, crown with a shallow transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant in dorsal view, in lateral view with anterior margins oblique and convex; clypeus slightly flattened medially, muscle impressions distinct; transclypeal suture entire or interrupted medially, clypellus in profile with its lower portion more nearly horizontal than remainder of face.

Thorax with pronotal width less than transocular width of head, lateral margins very short, parallel, dorsopleural carinae complete, posterior margin shallowly concave, disk with or without transverse rugae; scutellum rugose or not behind transverse sulcus. Forewing with membrane including all of apical cells and extending proximad along costal margin, veins distinct, with inner anteapical cell open basally and bases of outer two anteapical cells proximal to claval apex, with four apical cells of which base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture opaque. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, narrowly rounded posterodorsally, without processes, macrosetae parallel to posteroventral margin, arranged irregularly. Plates short triangular, not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae. Style not extending

posteriorly nearly as far as apex of connective, preapical lobe prominent, apex narrowly truncate. Aedeagus digitate, without processes, dorsal margin not strongly convex. Paraphyses with long slender acute rami arising from a short transverse basal piece.

Female abdominal sternum VII moderately produced, broadly convex at apex. Ovipositor with dorsal teeth on second valvula throughout portion beyond basal curvature, the teeth widely spaced near base, apex acute (entire valvula, not illustrated, similar to that of *Isogonalia sexlineata* (Signoret) (fig. 662*p, q*)). Pygofer narrowly rounded apically, with a broad group of macrosetae of varied sizes parallel to posteroventral margin.

Cinerogonalia is known only from the type-species, small, broad-headed leafhoppers irrorate with brown, known only from Colombia and Venezuela. The male genitalia are similar to those found in *Sibovia* China and *Cyclogonia* Melichar, but the female structures are similar to *Isogonalia,* new genus, and some genera related to it (*Campecha* Melichar, and *Graphocephala* Van Duzee), and to *Apogonalia* Evans.

My identification of the type-species rests on a study of the type and a topotypic male paratype (fig. 618) from Carnegie Museum.

I have seen specimens of *C. liturıceps* from Venezuela collected on *Thymus vulgaris* L., and on cotton.

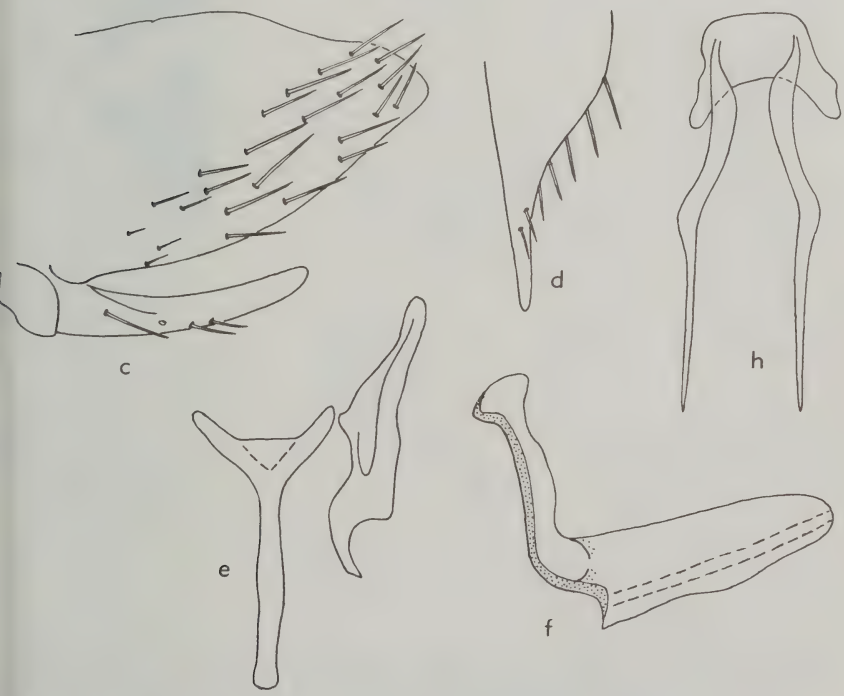


FIGURE 618.—*Cinerogonalia liturıceps* (Osborn) (from paratopotype).

100. SISIMITALIA, NEW GENUS

FIGURES 619-621

Type-species: *Tettigonia vulnerata* Signoret.

Length 7.1-8.8 mm.

Head moderately produced, median length of crown varying from six-tenths to slightly less than seven-tenths interocular width and from slightly more than one-third to more than four-tenths transocular width, anterior margin narrowly to broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or before a line between anterior eye

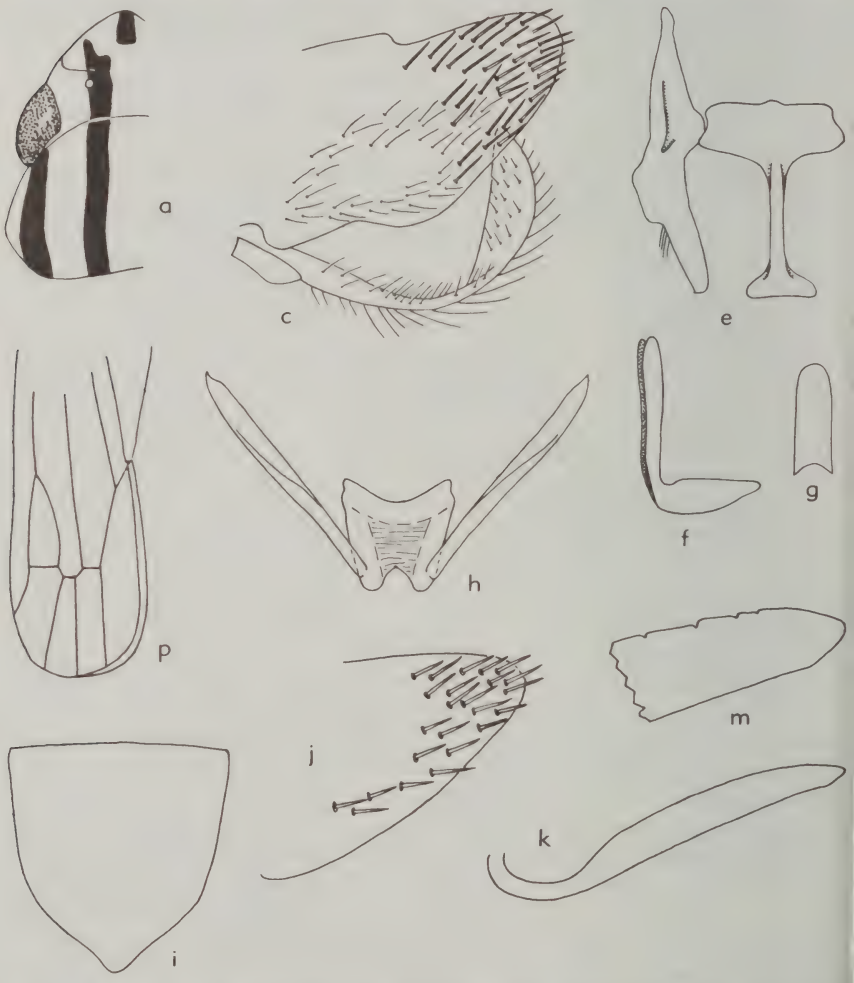


FIGURE 619.—*Sisimitalia vulnerata* (Signoret) (from specimens from Yepocapa, Guatemala; *h* from caudal view; only aedeagal shaft shown in *g*): *p*, Apex of forewing.

angles, relative distance from ocellus to median line and to adjacent anterior eye angle varying interspecifically, crown flat on disk, with or without a distinct concavity, without sculpturing or sparsely punctate, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges in lateral view with anterior margins oblique and rectilinear or slightly convex, clypeus flat medially, muscle impressions distinct or not, transclypeal suture incomplete, contour of clypellus continuing profile of clypeus, or slightly more nearly horizontal.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, posterior margin concave, disk transversely rugose, punctate or not, not pubescent; scutellum transversely rugose or not behind transverse sulcus. Forewing with membrane varying interspecifically, veins indistinct except at apex, with three anteapical cells of which the one or two innermost are open basally, texture thickened, opaque, except apically, apical margin convex; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of proximal tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

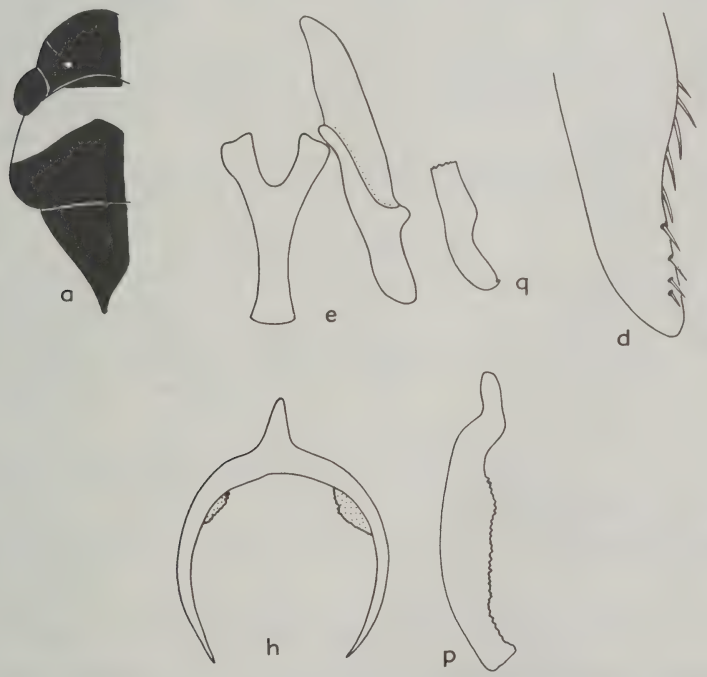


FIGURE 620.—*Sisimitalia rubricollis* (Fowler), lectotype: *p*, One ramus of paraphyses, from lateral view; *q*, style apex from lateral view.

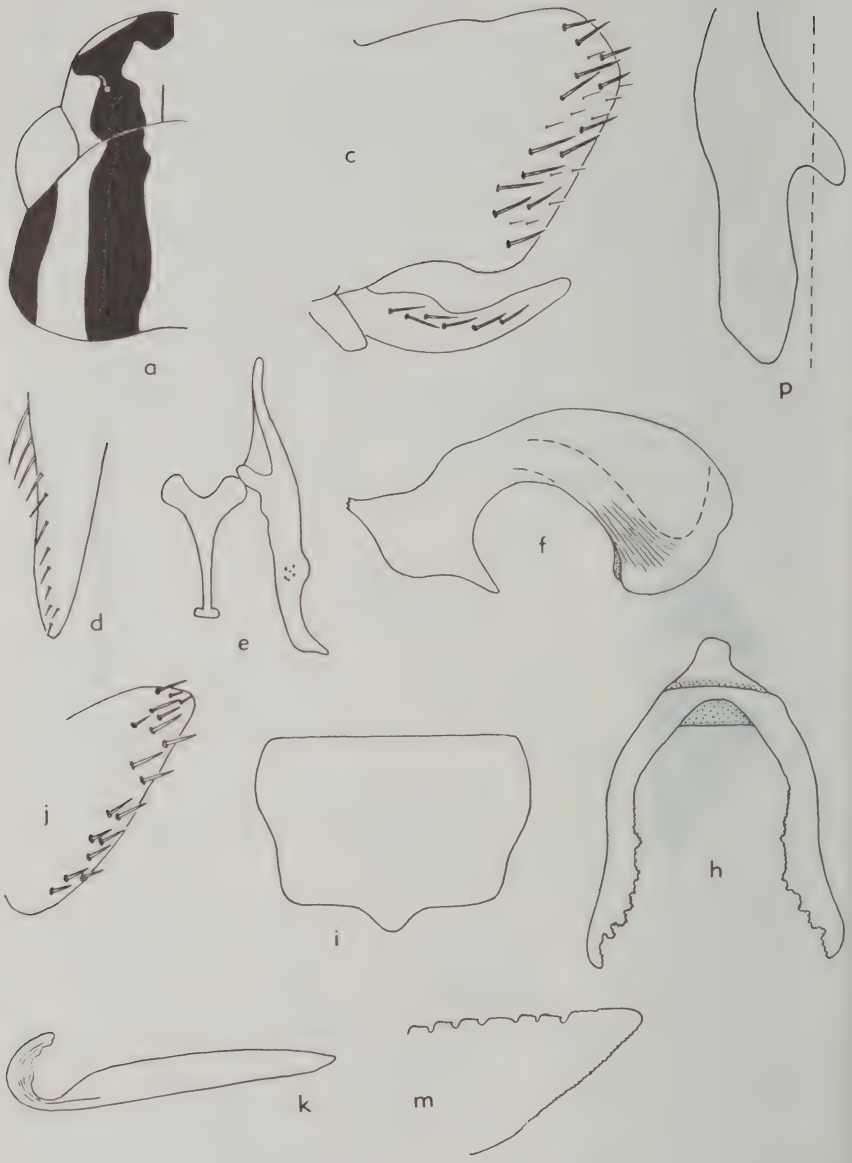


FIGURE 621.—*Sisimitalia infulata* (Fowler) (*i-k, m,* from specimen from Barro Colorado, Panama Canal Zone; remainder from specimens from Costa Rica; *h* from dorsal view); *p,* Male pygofer, right side, from caudoventral view.

Male genitalia: Pygofer moderately produced, posterior margin broadly convex, with chaetotaxy varying interspecifically. Plates triangular, extending posteriorly as far as pygofer apex, with chaetotaxy varying interspecifically. Style extending posteriorly as far as apex of connective, with a lateral lobe near midlength of shaft, apex convex or truncate. Connective Y- or T-shaped. Aedeagus short, without processes, shaft decurved or not, paraphyses short-stalked with rami slender, elongate, tapering.

Female abdominal sternum VII with posterior margin varying interspecifically from truncate to produced and gradually tapered. Dorsal membrane of genital chamber with a median sclerite or with none. Ovipositor with second valvula toothed throughout portion beyond basal curvature, teeth varying from broad and very few in number (*S. vulnerata* (Signoret)), to relatively much narrower and numerous, apex narrowly rounded. Pygofer narrowly rounded posterodorsally and with a number of submarginal macrosetae parallel to posterior and posteroventral margin.

S. infulata (Fowler) and *S. vulnerata* are banded longitudinally with black.

Sisimitalia ranges from southern Mexico to Colombia. I have placed it near *Sibovia* China because of similarities in both male and female genitalia, but the relationship probably isn't close. Species of *Sisimitalia* have one or two of the innermost anteapical cells open basally, in contrast to the closed anteapical cells of *Sibovia*.

Although I have seen the female lectotype, my identification of *Tettigonia infulata* Fowler is based chiefly on specimens compared with the original illustration. *Tettigonia rubricollis* Fowler is known to me only from the lectotype (fig. 620).

I have not seen specimens of *Tettigonia vulnerata* Signoret from the type-series. My identification of this species agrees with the original illustration.

SPECIES OF *SISIMITALIA*

infulata (Fowler), 1900d:282 (*Tettigonia*). S. Mexico, Costa Rica, Panama, Colombia. New combination.

rubricollis (Fowler), 1900a:260 (*Tettigonia*). S. Mexico. New combination.

vulnerata (Signoret), 1855d:782 (*Tettigonia*). Mexico, Guatemala, Honduras, Nicaragua. New combination.

KEY TO SPECIES OF *SISIMITALIA*

1. Pronotum black with a transverse vermilion band
   rubricollis (Fowler) (fig. 620)
   Pronotum with black longitudinal stripes on a paler (often orange) background 2

2. Aedeagus with shaft curved caudoventrally, male plates with uniseriate macrosetae; female abdominal sternum VII truncate
   infulata (Fowler) (fig. 621)
   Aedeagus with shaft not curved, male plates with numerous microsetae, without macrosetae; female abdominal sternum VII produced and tapered ..... *vulnerata* (Signoret) (fig. 619)

101. FONSECAIULUS, NEW GENUS

FIGURES 622-627

Type-species: *Tettigonia flavovittata* Stål.

Length 5.5-6.3 mm.

Head moderately produced, anterior margin broadly rounded in dorsal view, median length of crown varying from slightly more than six-tenths to

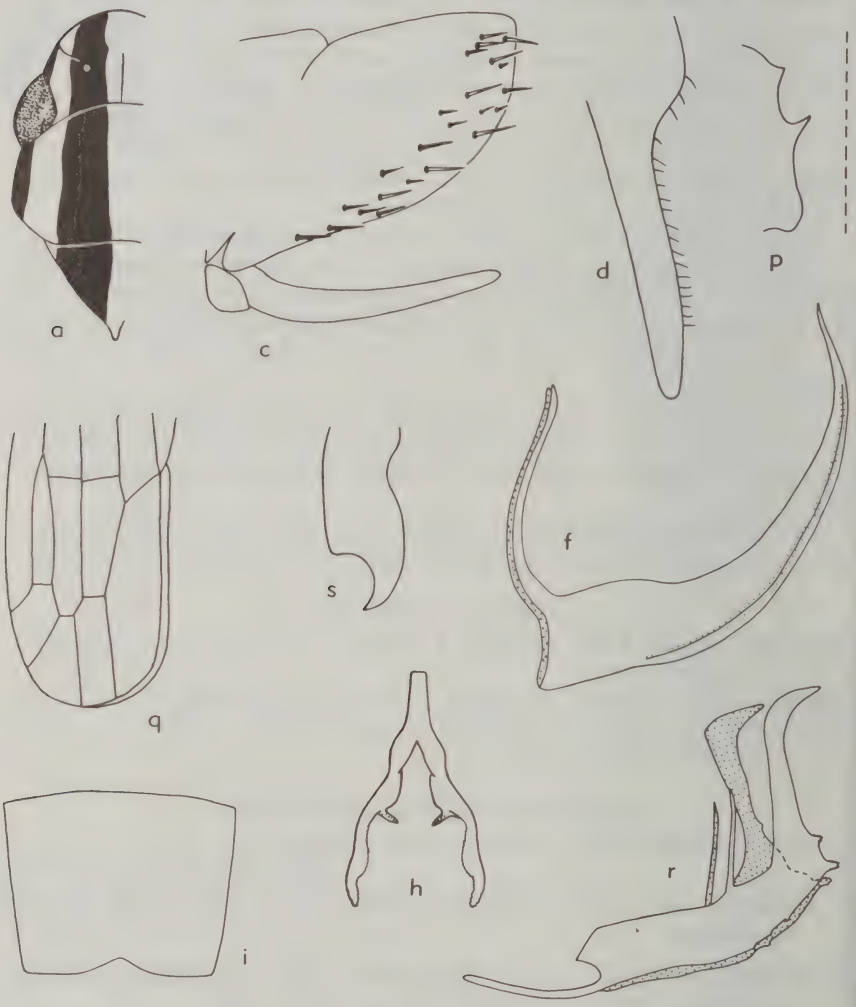


FIGURE 622.—*Fonsecaiulus flavovittata* (Stål) (*a, i,* from lectotype; *c, d, p,* from specimen from Rio de Janeiro, Brazil; *h* from Espírito Santo, Brazil; *q* from Tijuca, Brazil; remainder from unknown locality; *h* from ventral view): *p,* Male pygofer apex, left side, from caudal view; *q,* apex of forewing, *r,* paraphyses from lateral view; *s,* style apex.

slightly more than eight-tenths interocular width and from slightly less than four-tenths to slightly more than one-half transocular width, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with a slight transverse concavity before ocelli, without a median fovea and without sculpturing, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges in lateral view with anterior margins oblique and convex; without a vertical lenticular sclerite bordering lateral clypeal suture; clypeus not or only slightly flattened medially, muscle impressions distinct or not, transclypeal suture usually obsolete medially, clypellus with contour continuing profile of clypeus (exception: *F. dorsifascia* (Osborn)).

Thorax with pronotal width usually equal to transocular width of head (less than transocular width in *dorsifascia*), lateral margins slightly convergent anteriorly or parallel, disk without sculpturing or pubescence, scutellum not transversely striate behind transverse sulcus. Forewing with membrane including at least inner three apical cells, apical portions of anteapical cells, and usually apical portion of brachial cell (exception: *dorsifascia*), with three closed anteapical cells of which the bases are approximately opposite claval apex, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, apex convex, with multiseriate macrosetae in a diagonal group parallel to posteroventral margin, with or without short apical pygofer processes. Plates slender, triangular, not

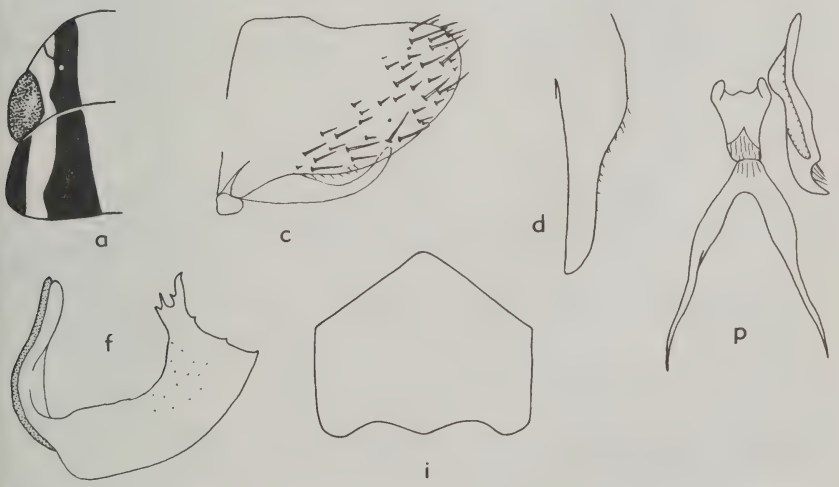


FIGURE 623.—*Fonsecaiulus sanguineovittata* (Signoret) (*i* from lectotype; remainder from specimen from Chapada, Brazil): *p,* Style, connective, and paraphyses, from dorsal view.

extending as far posteriorly as pygofer apex, fused basally, without macrosetae. Style extending posteriorly beyond apex of connective, with preapical lobe. Connective usually not distinctly Y-shaped. Aedeagus usually curved gradually dorsally, varying in form interspecifically, with apical processes or none. Paraphyses present, symmetrical, varying intraspecifically and interspecifically.

Female abdominal sternum VII not, or not strongly produced, with apical margin truncate or convex, apical portion with a median keel. Genital chamber with or without sclerites. Ovipositor with second valvulae expanded and

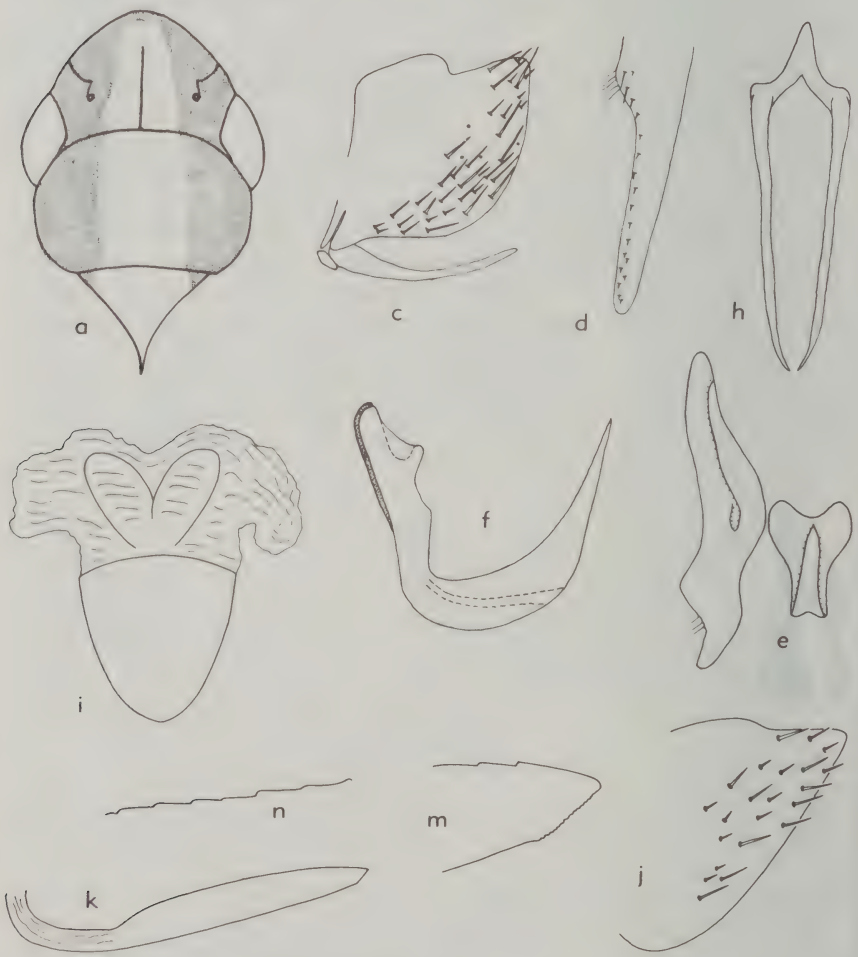


FIGURE 624.—*Fonsecaiulus dorsifascia* (Osborn) (*a* from holotype; remainder from specimens from Chapada, Brazil; *h* from dorsal view; dorsal wall of genital chamber and sclerites shown in *i*).

bearing dorsal teeth on portion beyond basal curvature, the teeth fairly uniform and usually bearing secondary denticles (weak and without secondaries in *dorsifascia*), apices rounded or acute *(dorsifascia)*. Pygofer narrowly rounded posterodorsally, disk with macrosetae on apical one-half to two-thirds.

Species of *Fonsecaiulus* either have conspicuous paired longitudinal black vittae on the crown and pronotum or a median yellow band from the apex of crown to the apex of clavus.

Fonsecaiulus occurs in Venezuela, eastern and southern Brazil, and Bolivia. *F. gaudialis,* n. sp. was collected on *Vernonia* sp. The genus is named in honor of Dr. José Pinto da Fonseca who has made notable contributions to our knowledge of neotropical Homoptera.

Fonsecaiulus, new genus, is related to *Erythrogonia* Melichar from which it may be distinguished most readily by the lack of plaquelike markings. Most of the species have longitudinal vittae similar to those of *Sibovia* China, but the posterior extent of connective of the male is shorter in relation to the styles, and the teeth of the second valvulae of the ovipositor are more extensive than in *Sibovia*.

My identification of *Entogonia cognata* Schmidt is based on the female lectotype. I have seen five additional specimens from Santa Catharina, Brazil, only one of which is a male, and somewhat teneral. The relationship of the paraphyses to the base of the aedeagus (fig. 625*q*) is not clear in this specimen.

I have identified *Cicadella dorsifascia* Osborn on the basis of the female holotype and males compared with it.

The present interpretation of *Tettigonia flavovittata* Stål is based on a study of the female lectotype, and a male compared with it. I think the present identification of *Tettigonia sanguineovittata* Signoret agrees with the lectotype, a female. Signoret's original illustration of that species isn't very accurate, as he pointed out. The anterior dorsum is similar to my sketch of the lectotype of *cognata* Schmidt.

SPECIES OF *FONSECAIULUS*

cognatus (Schmidt), 1928c:88 *(Entogonia)*. S. Brazil. New combination.
dorsifascia (Osborn), 1926b:182 *(Cicadella)*. S. Brazil. New combination.
flavovittata (Stål), 1859b:288 *(Tettigonia)*. SE. Brazil. New combination.
gaudialis, n. sp., Venezuela.
sanguineovittata (Signoret), 1855d:777 *(Tettigonia)*. Bolivia, S. and SE. Brazil. New combination.
sciotus, n. sp. Argentina, NE. Brazil.

KEY TO MALES OF *FONSECAIULUS*

1. Dorsum with a median pale stripe from apex of crown to claval apex *dorsifascia* (Osborn) (fig. 624)
   Not so marked 2

2. Aedeagus with ventral margin concave in lateral view
cognatus (Schmidt) (fig. 625)
Aedeagus with ventral margin convex in lateral view 3

3. Median yellow stripe of crown and pronotum extending through scutellum 4
Median yellow stripe of crown and pronotum scarcely attaining anterior portion of scutellum ..... *sciotus*, n. sp.

4. Forewing with a basal yellow claval spot that is deeply concave posteriorly ..... *sanguineovittata* (Signoret) (fig. 623)
Forewing without such a spot, the basal claval spot either attenuate posteriorly or somewhat truncate, not concave 5

5. Aedeagus slender, tapered, and acute at apex
flavovittata (Stål) (fig. 622)
Aedeagus rounded at apex ..... *gaudialis*, n. sp., page 767

Fonsecaiulus sciotus, NEW SPECIES

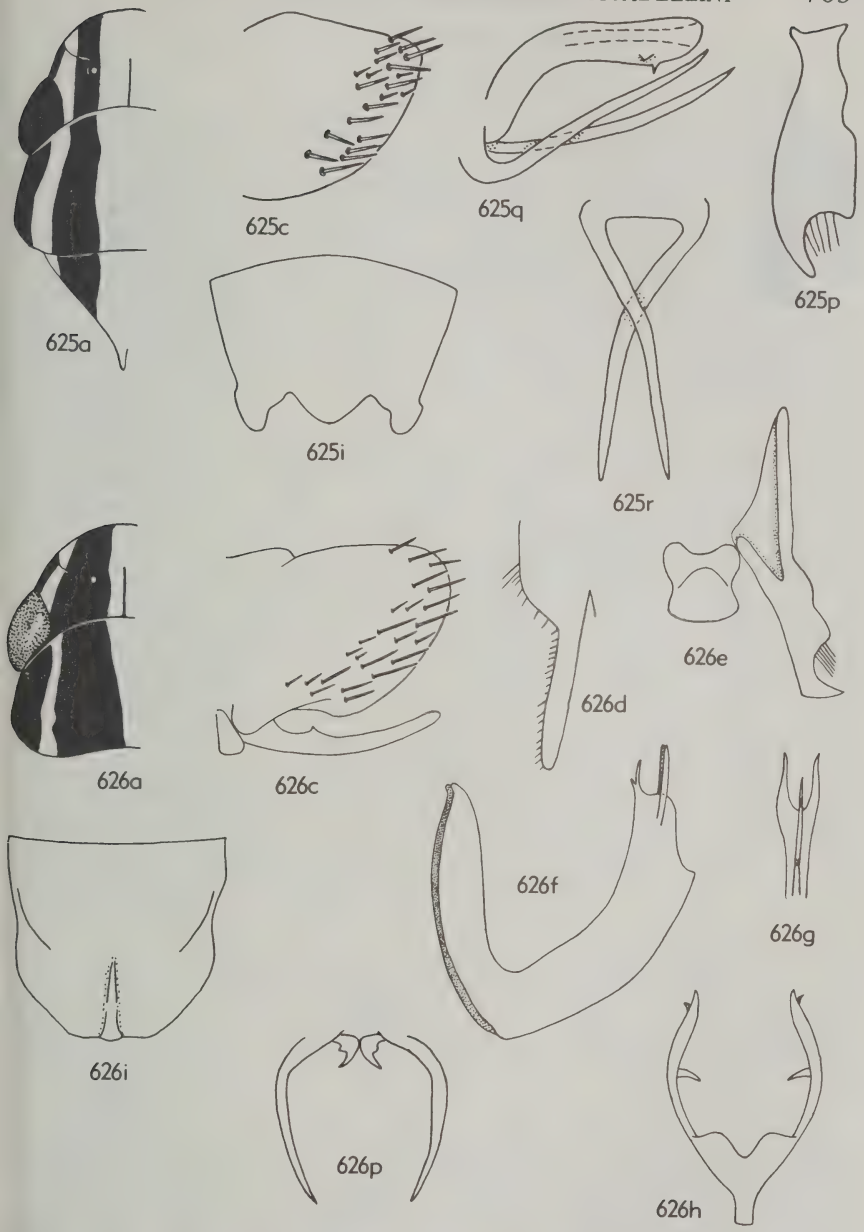
FIGURE 626

Length of male 5.5-6.1 mm, of female 6.1 mm. Head with median length of crown varying from slightly less than two-thirds to slightly more than three-fourths interocular width and from slightly less than four-tenths to slightly less than one-half transocular width. Male pygofer without processes, style foot-shaped at apex; aedeagus broadened apically in lateral view and obliquely truncate, with an unpaired dorsoapical process and a pair of slender tapering parallel processes arising near midlength of apical margin and extending dorsally; paraphyses short-stalked, with rami each bearing a short branch near midlength and a shorter one at apex. Female abdominal sternum VII with posterior margin broadly convex, genital chamber with a pair of elongate crescentiform processes in dorsal wall.

Color of dorsum chestnut-brown to reddish, median yellow vitta of crown extending onto pronotum and narrowing posteriorly, scarcely attaining scutellum, with a pair of much narrower longitudinal narrow yellow vittae on pronotum; forewing with a broad irregular yellow spot in basal half of clavus; with three (at most) pale spots in corium near claval suture in its apical half, the spots confluent in some specimens; face, pleura, venter, and legs, yellow.

Holotype male, Loreto, Misiones, Argentina, December 14, 1931 (A. A. Ogloblin) and one female, same data except December 3, 1931 (USNM). One male, Puerto Bemberg, Misiones, Argentina, January 12-29, 1945 (Golbach and Hayward) (Instituto Miguel Lillo collection). Two females, S. Antonio de Barra, Prov. of Bahia (Ch. Pujol) (MMB).

The male genitalia of *F. sciotus*, n. sp., and the color pattern used in the key will separate *sciotus* readily from other species of the genus.



FIGURES 625, 626.—625, *Fonsecaiulus cognatus* (Schmidt) (*a, i,* from lectotype; remainder from specimen from Santa Catharina, Brazil; plate not shown in *c*): *p,* Right style, *in situ,* from ventral view; *q,* aedeagal shaft and paraphyses, from lateral view; *r,* paraphyses from ventral view, bases not shown. 626, *F. sciotus,* n. sp. (*i, p,* from specimen from Misiones, Argentina; remainder from holotype; only apex of aedeagus shown in *g; h* from ventral view): *p,* Sclerites projecting from dorsal membrane into genital chamber.

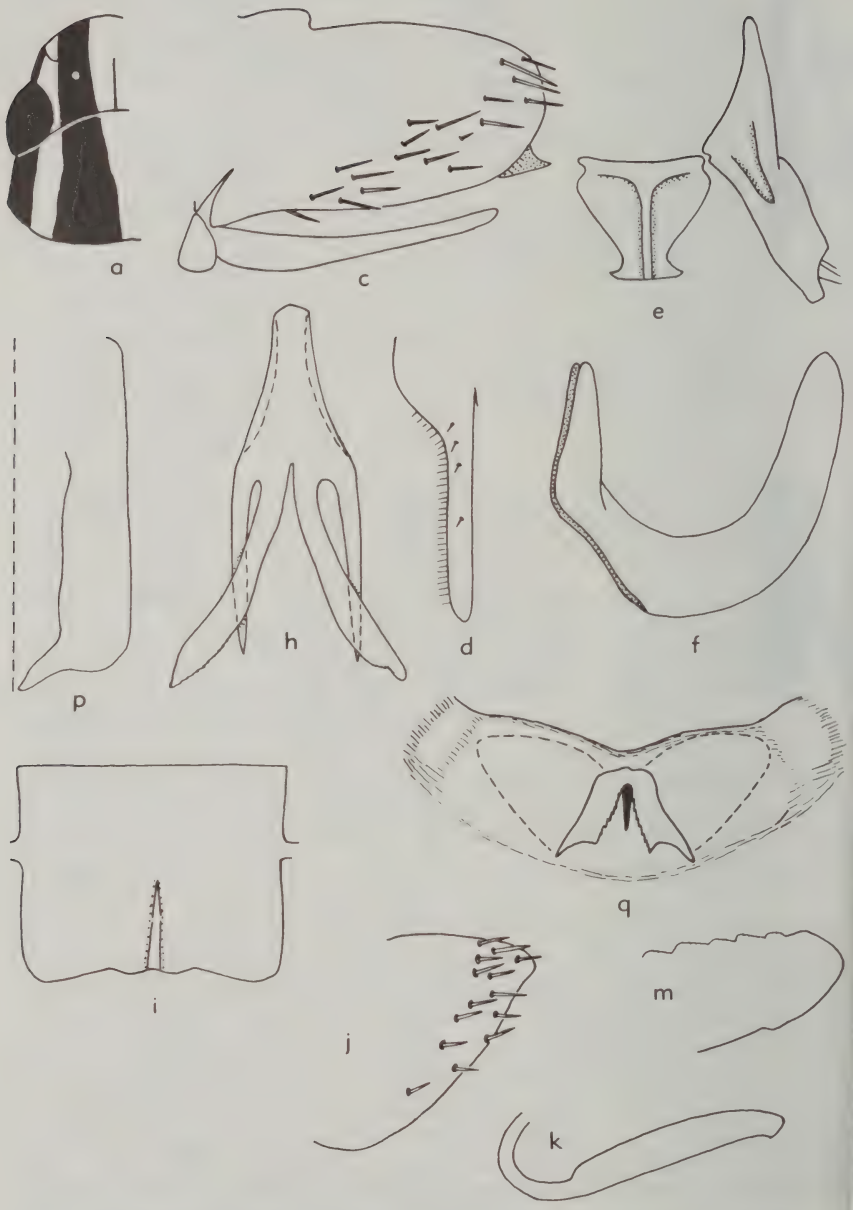


FIGURE 627.—*Fonsecaiulus gaudialis*, n. sp. (*a*, *c-h*, *p*, from holotype; remainder from specimen from Las Trincheras, Venezuela; *h* from ventral view): *p*, Male pygofer apex, left side, from ventral view; *q*, female genital chamber from caudal view.

Fonsecaiulus gaudialis, NEW SPECIES

FIGURE 627

Length of male 5.6-5.7 mm, of female 5.9 mm. Head with median length of crown varying from approximately seven-tenths to slightly more than eight-tenths interocular width and from slightly less than one-half to one-half transocular width. Male pygofer with a short apicoventral angular process extending mesally, style narrowed and truncate apically; aedeagus rounded apically, without processes, paraphyses longer-stalked than in *F. sciotus,* n. sp., with each of the rami bifid and with the ultimate branches of somewhat comparable length. Female abdominal sternum VII with posterior margin transverse and slightly concave, almost rectilinear, genital chamber with dorsal wall extensively sclerotized, and with a pair of more distinct, small sclerites flanking gonopore.

Head and pronotum longitudinally striped with yellow and chestnut-brown, the median pale vitta extending almost to apex of scutellum; clavus of forewing with a yellow border that is very narrow except near base of claval suture where it is as broad as the lateral pronotal pale vitta of which it is a continuation, remainder of clavus castaneous with a short thin yellow stripe parallel to claval suture; corium concolorous with disk of clavus, with an elongate vitta of varying width bordering and parallel to brachial cell, the vitta broader anteriorly and posteriorly than near its middle, and with two very small widely-spaced pale spots between this and costal margin. Face, pleura, venter, and legs, yellow.

Holotype male and two females, "Las Trincheras", D. F., Venezuela, on *Vernonia* sp., April 16, 1939 (C. H. Ballou); one male and two females, Los Teques, Venezuela, March 14, 1938, "on Eugenia jambos", and one male, Rancho Grande, Aragua, July 5, 1968 (J. Maldonado Capriles) (all USNM).

F. gaudialis, n. sp., can be most readily separated from other species in the genus by the form of the aedeagus of the male.

102. GENUS ERYTHROGONIA MELICHAR

FIGURES 628-633

Erythrogonia Melichar, 1926a:373. Type-species: *Cicada laeta* Fabricius, by original designation.

Length 5.4-9.2 mm.

Head moderately produced, median length of crown from usually slightly more than one-half to two-thirds (rarely as much as eight-tenths) its interocular width, and from slightly less than one-third to slightly more than four-tenths transocular width, anterior margin rounded in dorsal aspect, without a carina at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, disk with slight transverse concavity between ocelli, disk without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledge with

anterior margin obliquely convex in lateral view; face convex, without pubescence, muscle impressions distinct or not, transclypeal suture complete or obscure for only a short distance medially, clypellus continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carina rectilinear and horizontal or slightly oblique, not quite attaining posterior margin of adjacent eye, posterior pronotal margin concave, disk of pronotum and posterior portion of scutellum without pubescence and nearly always without sculpturing. Forewing usually with membrane which includes all of apical cells except base of fourth, occasionally including adjoining portion of anteapical cells also, veins distinct or not, not elevated, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture usually opaque; wings of female at rest exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, first tarsomere with length greater than combined length of second and third, with two rows of very small setae.

Male genitalia: Pygofer moderately produced, rounded apically, chaetotaxy varying interspecifically but with macrosetae never very sparse, often covering a considerable portion of disk and rarely with interspersed microsetae, processes present or absent, usually apical when present (occasionally ventral). Plates usually not extending as far posteriorly as pygofer apex, slender, triangular, fused basally (exception: *E. ekila*, n. sp.), usually narrowed near midlength and usually with uniseriate setae. Style quite variable interspecifically, but almost always extending posteriorly farther than connective, with or without a preapical lobe. Connective narrow, linear or Y-shaped, with or without a median keel. Aedeagus quite variable interspecifically, not articulated with connective. Paraphyses usually present and variable interspecifically.

Female abdominal sternum VII greatly variable interspecifically, posterior margin transverse, or (more often) emarginate, not produced medially. Genital chamber usually with sclerites in the membrane. Ovipositor with first valvulae with or without processes that are variable interspecifically when present; second valvulae broadened in all or most of portion beyond basal curvature, the primaries often with minute secondary denticles, with posteroventral anteapical denticles. Pygofer with macrosetae arranged more of less uniformly over disk, or anteapically and parallel to posteroventral margin.

Color of dorsum from pale red to deep red or black, usually marked with yellow.

Erythrogonia has been revised recently (1963a) by Medler who recognized 63 species and one subspecies. Because of the availability of this work, it is unnecessary to publish a key to species, or to repeat illustrations in the present work. Medler stated that host plants of species of *Erythrogonia* included banana, *Croton*, cotton, *Citrus*, *Lantana camara* L., and *Conostegia lanceolata* Cogniaux. Medler's illustrations of the forewings show an unexpected amount of variation in the anteapical cells, which are fairly constant in other genera. This resulted partly from the texture of the forewing in the region of the bases of these cells, a region where the venation is very difficult to see, and perhaps

partly from actual inconstancy in the occurrence of the crossveins at the bases of the inner two anteapical cells.

Not included in Medler's revision of *Erythrogonia,* is *Tettigonia calva* Taschenberg, 1884a:436, of which the present author has studied the male holotype. *Erythrogonia calva* (Taschenberg), new combination, is conspecific with *E. signoreti* Schmidt, *sens.* Medler and preempts the latter (new synonymy).

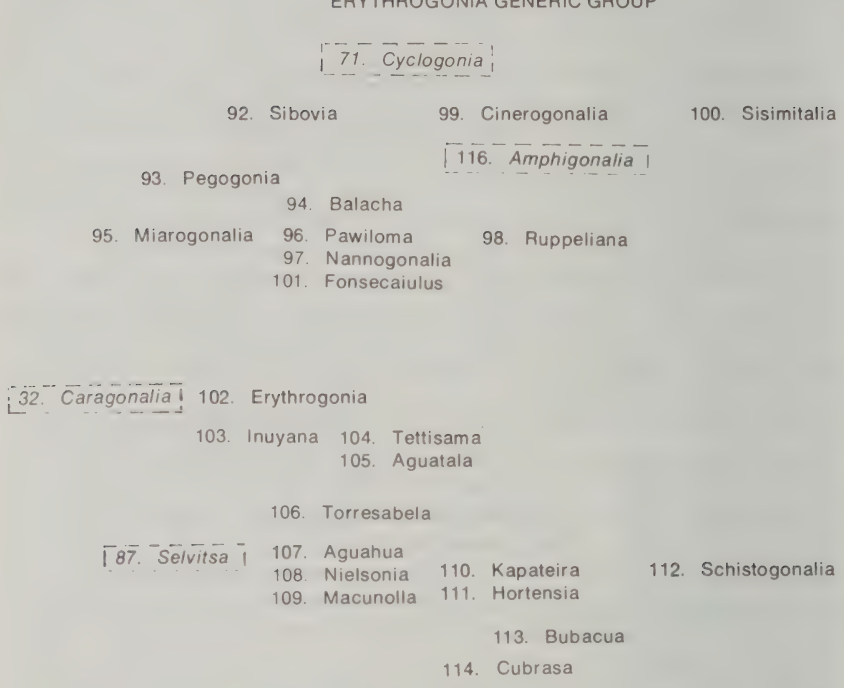
Erythrogonia occurs from the British West Indies and Mexico southward to Argentina, including all of South America, except Chile. Species are similar in many respects to species of *Inuyana,* new genus, but the presence of processes at the base of the anal tube, and the more nearly horizontal profile of the lower portion of the clypellus in *Inuyana* both differ from *Erythrogonia,* also the occurrence of ventral pygofer processes, rare in *Erythrogonia,* is found in all species of *Inuyana.* Also color patterns which occur in the latter genus do not occur in *Erythrogonia. Erythrogonia* is also similar to *Torresabela,* new genus, and to *Pawiloma,* new genus, in the treatments of both of which distinguishing characters are discussed. *Tettisama,* new genus, also belongs to the complex, but is readily separated by the larger size of the species and by the distinctive pygofer lobes of the male.

Genera numbered 92-114 form a group of which *Erythrogonia* is representative. The grouping is merely one of convenience, and is more heterogeneous than some of the others made here, especially the smaller ones, and as indicated above, complexes of genera occur within the generic group. There are other possible and not illogical associations, as indicated in the accompanying diagram by the generic names enclosed by broken lines, with three other generic groups. Efforts to find characters for the group, or for a better grouping, have been fruitless because of numerous exceptions to all of the many characters checked.

Medler (*op. cit.* p. 6) mentioned the "Type" of *Erythrogonia laeta* (Fabricius), but did not designate a lectotype. The present writer examined this specimen in Copenhagen and designated it as lectotype of the type-species (1965c:14). Medler *(loc. cit.)* pointed out the possibility that Melichar had misdetermined the type-species. Medler used the nominal species *E. laeta* (Fabricius) as type-species and in this action he is followed here. The male genitalia of the lectotype agree with the present illustration (fig. 633*f, h,*) of the specimen from Trinidad.

Tettigonia leucospila Walker is known to me only from the only specimen in the British Museum, presumably the holotype, a specimen without abdomen from Peru. It appears correctly placed in *Erythrogonia.*

Medler also failed to designate a lectotype of *E. sexguttata* (Fabricius). Young (*op. cit.,* p. 16) designated as lectotype the specimen Medler studied, in the Fabrician collections in Copenhagen. Medler's selection, as neotype of *E. colorata* (Germar), a specimen without abdomen in the Naturhistorisches Museum in Vienna is unfortunate, since the Germar collection is possibly extant, and since there are a number of specimens from the Germar collection in the Zoologisches Institut und Museum, in Hamburg.



I have not seen a specimen eligible to be lectotype of *Cicada splendida* Fabricius. I place it in *Erythrogonia* on the basis of Signoret's illustration (1854b: plate 11, fig. 15), which appears to be close to *E. jumaca* Medler.

Medler did not select a lectotype of *E. phoenicia* (Signoret). The specimens (NMV) he mentioned as "Type", with labels: "San Paolo/Coll. Signoret" and "phoenicia/det. Signoret", without abdomen, is here designated lectotype and will be so labeled. A female specimen, with the same data, is in the same collection. The lectotype bears also a label: "Type", in pencil.

Medler (*op. cit.*, p. 18) mentioned a "Type" of *E. quadriguttata* (Fabricius), which is apparently the same specimen Young (*op. cit.*, p. 16) selected as lectotype. The specimen bore no type label when Young studied it.

A specimen of *Erythrogonia dorsalis* (Signoret) in the museum in Vienna, bears a "type" label, added by Medler. No lectotype has been selected for it. Both of the preceding facts apply also to *E. areolata* (Signoret). In addition, although Medler's revision mentions "type" in the treatment of each of the following, no lectotypes have been selected: *E. signoreti* Schmidt, *E. quadriplagiata* (Walker), *E. proterva* Melichar, *E. onerata* Melichar, *E. marilis* Melichar, *E. duplicata* Melichar, *E. laudata* (Walker), and *E. sonora* Melichar.

SPECIES OF *ERYTHROGONIA*

accepta Medler, 1963a:19. Mexico.
albovittata Melichar, 1926a:392. Peru.
amicula (Jacobi), 1905c:179 *(Tettigoniella)*. Peru, Bolivia.
anduzei, n. sp. Venezuela.
areolata (Signoret), 1853b:355 *(Tettigonia)*. Mexico, Honduras, Guatemala, El Salvador, Costa Rica.
aurivagula (Jacobi), 1905c:178 *(Tettigoniella)*. Peru, Bolivia.
bakula Medler, 1963a:20. Bolivia.
calva (Taschenberg), 1884a:436 *(Tettigonia)*. Venezuela, N. Brazil, S. Brazil, Argentina. New combination.
signoreti Schmidt, 1928a:61. New synonymy.
colorata (Germar), 1821a:68 *(Tettigonia)*. S. Brazil.
comensa Medler, 1963a:8. Argentina.
diversa Schmidt, 1928a:55. Bolivia.
dorsalis (Signoret), 1853b:349 *(Tettigonia)*. Brazil.
dottaga Medler, 1963a:7. SE. Brazil, Argentina.
dubia Medler, 1963a:6 (*Erythrogonia sexguttatata* ssp.) Brazil.
duplicata Melichar, 1926a:384. Bolivia.
eburata Melichar, 1926a:377. Peru.
ekila, n. sp. Ecuador.
excisa Melichar, 1926a:378. Brazil.
execta Medler, 1963a:18. Mexico.
fissonustula (Jacobi), 1905c:178 *(Tettigoniella)*. Peru, Bolivia.
fractina Medler, 1963a:8. Mexico.
gossana Medler, 1963a:7. Mexico, Honduras.
hertha Medler, 1963a:9. SE. Brazil.
imitatricula (Jacobi), 1905c:180 *(Tettigoniella)*. Peru, Bolivia.
incerta Medler, 1963a:19. Colombia.
insolana Medler, 1963a:13. Costa Rica.
jucunda (Walker), 1851b:757 *(Tettigonia)*. Mexico, Honduras, British Honduras, Guatemala.
jumaca Medler, 1963a:17. Fr. and Br. Guiana, N. Brazil.
kokomona Medler, 1963a:21. Peru.
ladonia Medler, 1963a:19. Guatemala, El Salvador, Costa Rica.
laeta (Fabricius), 1787a:271 *(Cicada)*. Mexico, Costa Rica, Panama, Venezuela, Trinidad.
laudata (Walker), 1858a:95 *(Tettigonia)*. Mexico, Honduras, British Honduras.
leucospila (Walker), 1858b:217 *(Tettigonia)*. Peru.
marilis Melichar, 1926a:382. N. Brazil.
melichari Schmidt, 1928a:60. S. Brazil.
mixta Medler, 1963a:7. N. and central Brazil.
nativa Melichar, 1926a:390. Colombia.

notara Medler, 1963a:10. S. Brazil.
notatula Melichar, 1926a:380. N. Brazil.
odonsera Medler, 1963a:10. S. Brazil, Paraguay, Argentina.
onerata Melichar, 1926a:379. Peru.
partita Melichar, 1926a:376. Mexico, Costa Rica.
pectinata, n. sp. N. Brazil.
phoenicia (Signoret), 1853b:353 (*Tettigonia*). S. Brazil.
hospita Melichar, 1926a:384.
plagiella Melichar, 1926a:381. Colombia, Venezuela, Fr. Guiana, N. Brazil.
priscilla Medler, 1963a:18. Mexico.
proterva Melichar, 1926a:388. Brazil.
quadriguttata (Fabricius), 1787a:271 (*Cicada.*). Trinidad, Venezuela.
quadriplagiata (Walker), 1851b:774 (*Tettigonia*). Costa Rica, Panama, British West Indies, Colombia, Venezuela.
gracilis Melichar, 1926a:386.
perjucunda Melichar, 1926a:390.
quissota Medler, 1963a:16. Colombia, Ecuador.
relegata Medler, 1963a:6. (Interception at Mobile, Alabama, U. S. A.).
separata Melichar, 1926a:391. S. Brazil.
servilis Melichar, 1926a:382. N. and NE. Brazil.
sexguttata (Fabricius), 1803a:75 (*Cicada*). Venezuela, N. Brazil, Br. and Fr. Guiana, Peru, Bolivia, Argentina.
socialis Melichar, 1926a:379. Peru, Bolivia.
sonora Melichar, 1926a:388. Honduras, Nicaragua, Costa Rica.
sparta Melichar, 1926a:381. N. Brazil.
splendida (Fabricius), 1803a:68 (*Cicada*) (new name). [Venezuela]. New combination.
festiva (Fabricius), 1798a:521 (*Cicada*) (preoccupied).
spottana Medler, 1963a:7. Mexico.
taklara Medler, 1963a:17. Costa Rica.
triplicula (Jacobi), 1905c:179 (*Tettigoniella*). Peru, Bolivia.
usabida Medler, 1963a:20. Mexico.
vaccoma Medler, 1963a:15. Fr. Guiana.
velox Melichar, 1926a:378. E. Brazil.
warsula Medler, 1963a:20. Peru.
xiperca Medler, 1963a:20. Centr. and W. Brazil.
yestula Medler, 1963a:13. Ecuador, Bolivia.
ziczacula Medler, 1963a:13. Peru.

Erythrogonia ekila, NEW SPECIES

FIGURE 628, PAGE 774

Length 6.7-6.9 mm. Head with median length of crown from two-thirds to slightly more than three-fourths interocular width and from slightly less than four-tenths to slightly more than four-tenths transocular width. Forewing with membrane not delimited, veins not very distinct. Male pygofer narrow and more strongly produced than usual in the genus, with macrosetae occurring on apical two-thirds, with an apical process directed mesally and anteriorly, not crossing its complement; plates not extending posteriorly nearly as far as pygofer apex, each triangular, not fused basally, with few uniseriate macrosetae on apical half; style without a preapical lobe, apical half gradually

narrowed to acute apex; connective subquadrate with a median keel; aedeagus curved gradually posteriorly and dorsally through 90°, without processes. Female abdominal sternum VII with posterior margin deeply V-shaped, with base of emargination truncate and sides somewhat sinuate; pygofer with apex subacute, macrosetae elongate, sparse, arranged in basal and anteapical groups and a few located along posteroventral margin; genital chamber with a pair of conspicuous processes arising one on each side behind apex of sixth sternum, each slender and extending posteriorly. Other structural characters as in generic description.

Color of crown and pronotum black, a broad triangular marking bordering basal margin of crown and a median pronotal marking over basal three-fourths, ivory, the latter separated from the former by the narrow anterior black margin of pronotum; scutellum and forewings smoky brown with a transverse transcommissural pale marking on forewings behind scutellum, not attaining costal margins, and a subhyaline corial marking extending from behind claval apex to costal margin on each wing, gradually widened towards costa, claval apices pale; face, thoracic pleura, venter, and legs, stramineous.

Holotype male, one additional male and four females, Abitagua, Ecuador, 1200 meters, May 25, 1939 (W. Clark-Macintyre); one pair, Oriente, Ecuador, and one male, "Rio Arajuno", Napo Watershed, Ecuador (NCS). Holotype on indefinite loan to USNM.

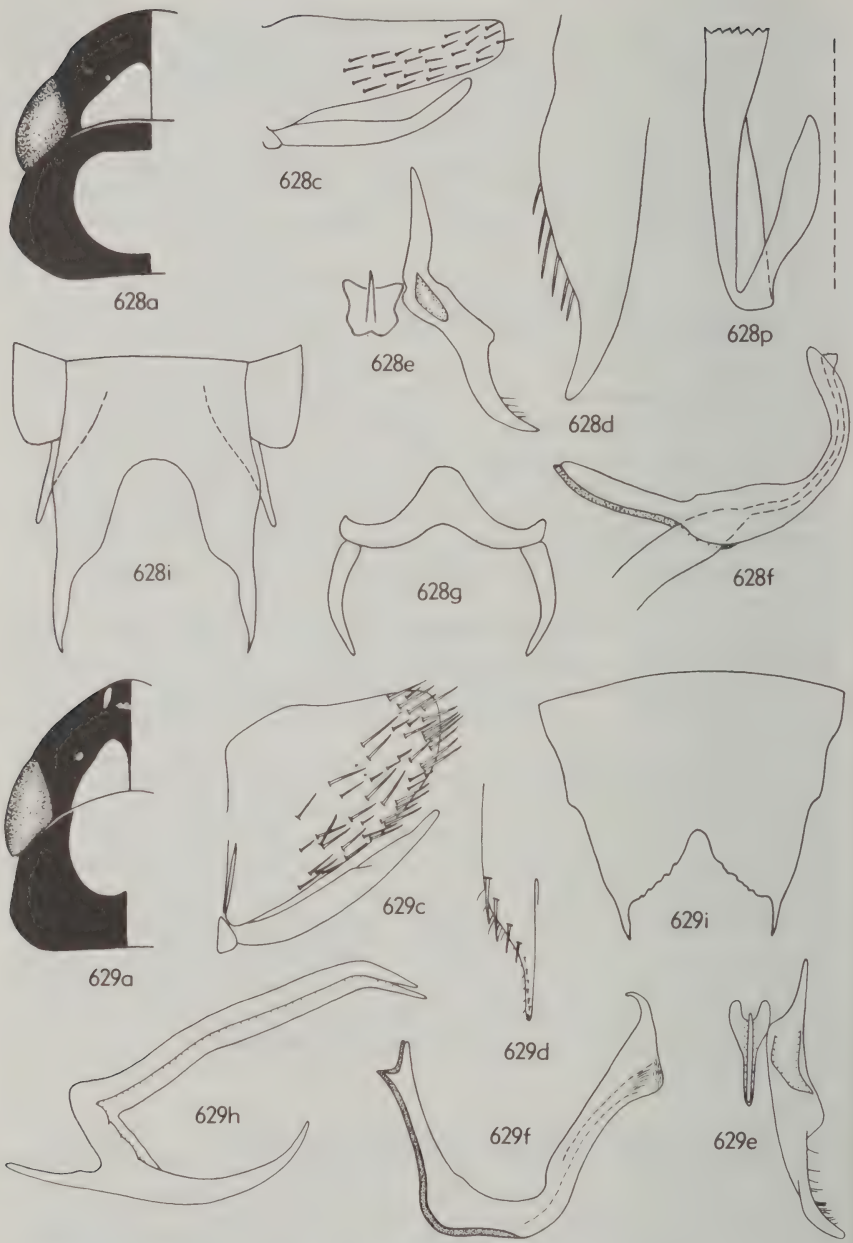
E. ekila, n. sp., is most closely related to *E. notatula* Melichar but is unlike all other species of the genus in that pale markings of crown and pronotum are separated by the black anterior pronotal margin. The male genitalia are closer to Medler's (1963a:30) illustration of *E. sparta* Melichar than to any of the other species in the genus.

The processes of the female genital chamber of *E. ekila* are in similar location to those found in some other species of *Erythrogonia.* Processes arising near the laterobasal margins of the seventh sternum, from either the membrane of the genital chamber or from the first valvifer are found in *areolata* (Signoret), *phoenicia* (Signoret), *signoreti* Schmidt, *jucunda* (Walker) and *colorata* (Germar). In several other species there is some sclerotization of the membrane of the genital chamber in this area, but not in the form of definite processes. In *ekila,* these processes are not visible in dried specimens, but are quite distinct after maceration in KOH. In some species, e.g. *areolata* (Signoret), the processes are quite distinct externally, although not shown in any of the published illustrations.

Erythrogonia anduzei, NEW SPECIES

FIGURE 629, PAGE 774

Length of male 6.2-6.8 mm, of female 6.4 mm. Head with median length of crown from six-tenths to three-fourths interocular width and from slightly less than four-tenths to slightly greater than four-tenths transocular width. Forewing with membrane including all of apical and small portion of anteapical cells. Male pygofer not strongly produced, with macrosetae on apical half, processes absent; plates not extending as far posteriorly as pygofer apex,



FIGURES 628, 629.—628, *Erythrogonia ekila*, n. sp. (*i* from topotype, remainder from specimen from Oriente, Ecuador; *h* from ventral view): *p*, Male pygofer apex, right side, from ventral view. 629, *E. anduzei*, n. sp. (*i* from topotype; remainder from holotype; *h* from lateral view).

narrowed near midlength, each with uniseriate macrosetae on apical two-thirds; style extending posteriorly much farther than connective, without preapical lobe; connective narrowly Y-shaped with stem longer than arms and strongly keeled; aedeagus without processes before apex, apex expanded slightly and with a short curved process from anterior margin; paraphyses consisting of a pair of dorsal processes and an unpaired ventral shorter process. Female abdominal sternum VII with posterior margin convex each side of median regular concavity, posterolateral portion produced in an acute point on each side; pygofer with posterior margin subacute, macrosetae arranged much as in male, genital chamber with paired median sclerites but without processes arising near laterobasal angles of sternum VII.

Color of dorsum tan (type) to black with a pair of small spots at apex of crown, a pair of much larger triangular spots at its base confluent with each other and with a large median spot over basal three-fourths of pronotum, a transcommissural spot and another at claval apex, the latter including part of corium, and a triangular spot along costal margin in apical half, ivory; membrane smoky except a hyaline triangular lateral area which is bordered with red anteriorly; venter, pleura, and legs stramineous except dorsal portion of pleura which is concolorous with dorsum.

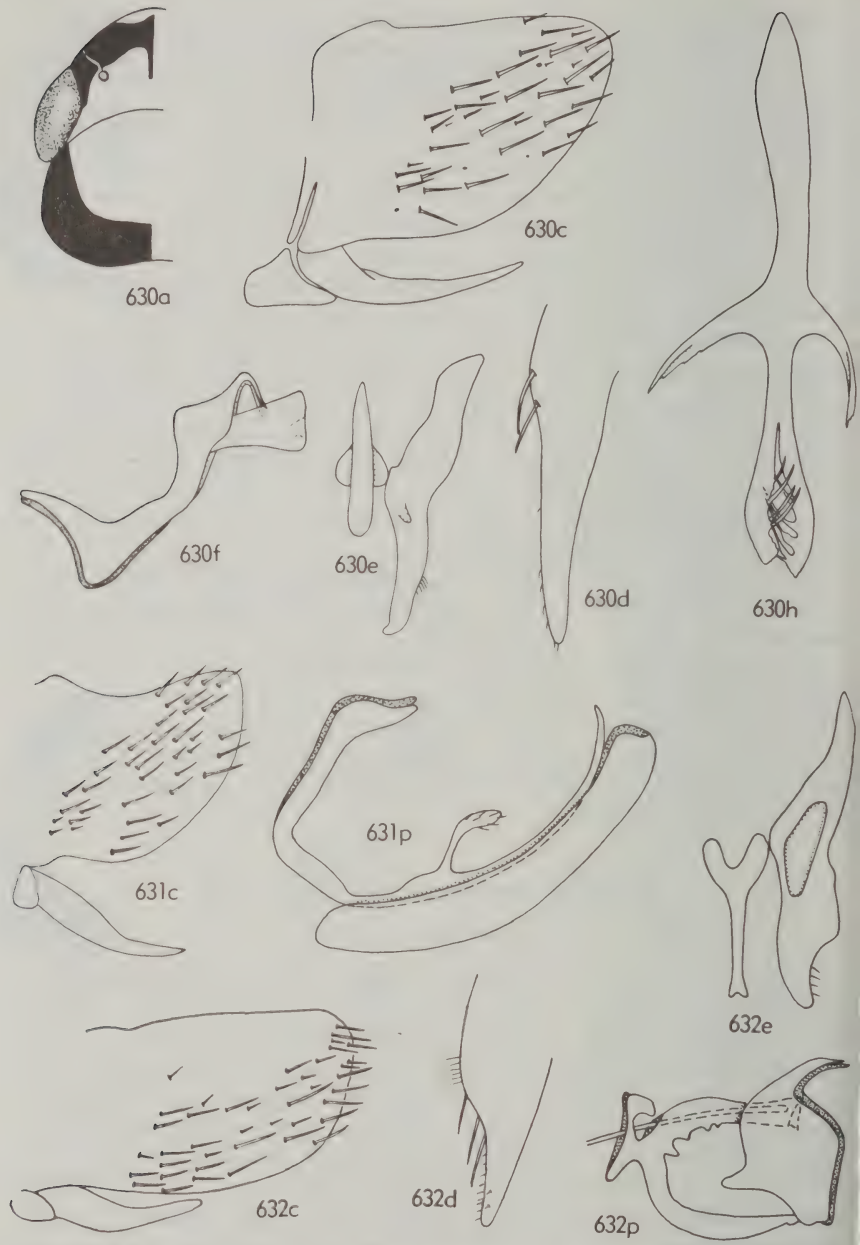
Holotype male and one female, San Estebán, Venezuela, November 22-30, 1939 (P. Anduze) (USNM). One male, Guanare, Portuguesa, Venezuela, September 10-13, 1957 (B. Malkin) (CAS).

E. anduzei is named in honor of Pablo Anduze, whose collections in Venezuela have helped in increasing our knowledge of the neotropical fauna. This species is closely related to *E. laeta* (Fabricius) from which it can be distinguished readily by its more distinctly three-branched paraphyses in the male and its shallower median concavity of the posterior margin of abdominal sternum VII of the female.

Erythrogonia pectinata, NEW SPECIES

FIGURE 630, PAGE 776

Length of male 6.4 mm. Head with median length of crown slightly more than one-half interocular width and one-third transocular width. Forewing with membrane as in *E. anduzei*, n. sp. Male pygofer not strongly produced, posterior margin strongly convex, with macrosetae on apical two-thirds, processes absent; plates slender, not extending posteriorly as far as pygofer apex, each abruptly narrowed near base thence gradually tapered to acute apex; style extending much farther posteriorly than apex of connective, without preapical lobe, gradually tapered to narrowly rounded apex which is directed slightly mesad; connective narrow, not Y-shaped, with a strong keel extending anteriorly and posteriorly; aedeagus short, expanded anteapically and giving off a pair of slender decurved tapering processes; paraphyses consisting of an elongate stalk which gives off one pair of slender tapering processes which are directed laterodorsally and one pair of longer broader processes which are directed posteriorly and provided with teeth on their mesal margins, the teeth of one branch overlapping those of its complement.



FIGURES 630-632.—630, *Erythrogonia pectinata*, n. sp., holotype (*h* from near-dorsal view). 631, *E. taklara* Medler (from specimen from Costa Rica): *p*, Aedeagus and paraphyses, from lateral view. 632, *E. vaccoma* Medler (from specimen from French Guiana): *p*, Aedeagus and paraphyses, from lateral view.

Color of dorsum chocolate-brown changing gradually to pink near forewing apices, with a pair of small spots at apex of crown, a large semicircular spot between eyes continuous with a semioval spot on basal two-thirds of pronotum and a round spot in basal half of forewing which attains neither margin, yellow, a pink spot in apical half of forewing; face, thoracic pleura except dorsally, and legs stramineous; dorsal portion of thoracic pleura concolorous with dorsum.

Holotype male, Obidos, Amazonas, Brazil (USNM).

E. pectinata, n. sp., may be separated readily from all other species in the genus by the form of its peculiar paraphyses.

Erythrogonia taklara, Medler

Figure 631, page 776

Erythrogonia taklara Medler, 1963a:17.

This species was known only from females at the time it was described. The male genitalia are as follows. Pygofer weakly produced, subangulate posterodorsally, posterior and posteroventral margins regularly convex, disk with macrosetae distributed over apical two-thirds; plates short, triangular, not extending nearly as far posteriorly as pygofer apex, each with uniseriate macrosetae on basal two-thirds; style short, without a distinct preapical lobe, apex narrowly rounded and directed slightly mesad; connective short Y-shaped, not extending as far posteriorly as style apex, aedeagus slender, elongate, gradually tapered, with a weak, curved, dorsal process before midlength; paraphysis troughlike, partially enclosing aedeagus; anal tube with a short lateroventral triangular projection on each side of segment X.

E. taklara Medler is very closely related to *E. quadriplagiata* (Walker) in the structure of the male genitalia, but differs in the dorsal aedeagal process and somewhat in the shape of the pygofer from the Walker species.

Erythrogonia vaccoma Medler

Figure 632, page 776

Erythrogonia vaccoma Medler, 1963a:15.

This species was known only from females at the time it was described. The male genitalia are as follows. Pygofer strongly produced and broadly convex apically, disk with macrosetae distributed irregularly over apical two-thirds; plates very short, triangular, not extending posteriorly beyond midlength of ventral pygofer margin, each with a few macrosetae in a short longitudinal row near midlength; style short, with a distinct preapical lobe, apical portion curved slightly posterolaterally and narrowly rounded at tip; connective Y-shaped with stem longer than arms, keeled; aedeagus with shaft narrow, almost straight, directed posteriorly, with a few denticulations on ventral margin near base and with a ventral Y-shaped process arising near base, the

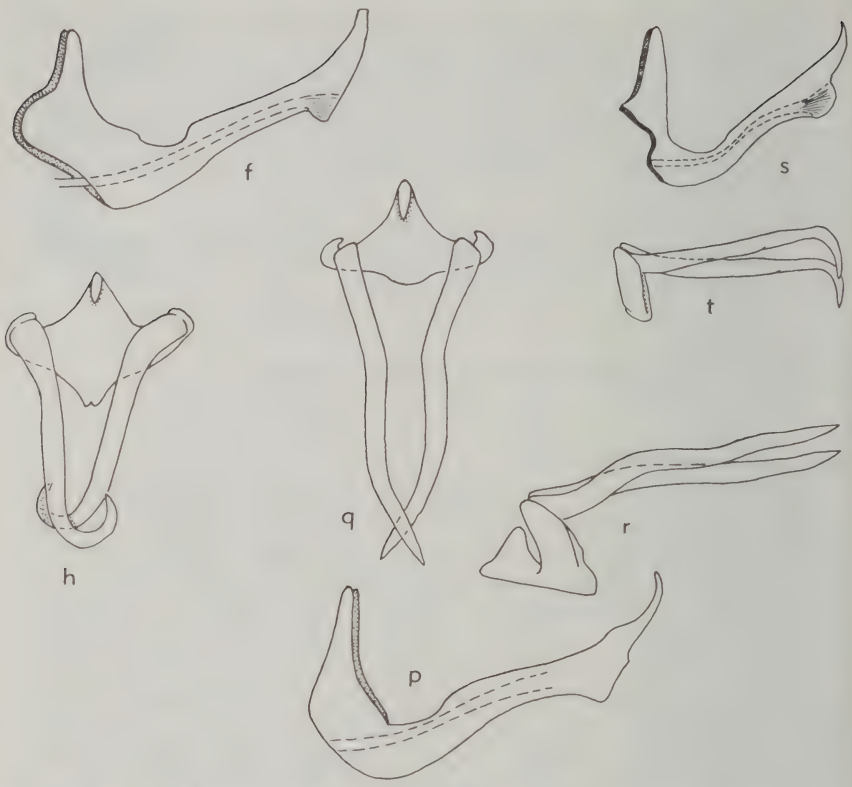


FIGURE 633.—*Erythrogonia laeta* (F.) (*f*, *h*, from specimen from Trinidad; *p-r*, from Costa Rica; *s*, *t*, from Panama): *f*, *p*, *s*, Aedeagus from lateral view; *h*, *q*, paraphyses from dorsal view; *r*, *t*, paraphyses from lateral view.

arms broad and each with a lobe directed anteriorly near its base and an acute apical portion directed posteriorly.

E. vaccoma Medler is very closely related to *E. plagiella* Melichar. The arms of the ventral process are much more slender and truncate apically in the Melichar species.

103. INUYANA, NEW GENUS

FIGURES 634-637

Type-species: *Inuyana juninensis*, n. sp.

Length of male 6.1-8.5 mm, of female 6.5-8.7 mm.

Head moderately produced, median length of crown varying from slightly less than one-half to slightly more than six-tenths interocular width, and from three-tenths to slightly more than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from

crown to face, ocelli located on or slightly behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, disk with a slight transverse concavity across ocelli and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledge with anterior margin strongly oblique and rectilinear or convex in lateral view; face without pubescence, clypeus flattened medially, muscle impressions not distinct, transclypeal suture distinct or obscure medially, clypellus with contour mostly more nearly horizontal than profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, not quite attaining posterior margin of adjacent eye, disk of pronotum and posterior portion of scutellum without pubescence and transversely rugulose or not. Forewing with membrane including all of apical cells except base of fourth apical cell in some species and also apical portions of anteapical cells (except in *I. ucaya*, n. sp.), veins usually distinct, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins or supernumerary veins to costal margin, texture coriaceous, wings of female at rest exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length greater than combined length of two more distal tarsomeres and with two rows of small setae on plantar surface.

Male genitalia: Pygofer well produced, convex apically, macrosetae numerous and occurring at apex and on ventral portion of posterior two-thirds of disk, without interspersed microsetae, processes arising from ventral margin, extending dorsally or dorsomesally. Plates usually extending posteriorly as far as pygofer apex (variable interspecifically), slender, triangular, fused basally, narrowed at midlength, with uniseriate macrosetae. Anal tube with a slender process on each side at apex of segment X (exception: *I. pendulosa* (Osborn)). Style somewhat variable interspecifically, always extending posteriorly farther than connective, with or without a preapical lobe (variable interspecifically); connective short, Y-shaped but with an elongate median keel. Aedeagus elongate, with ventral margin concave, with or without processes on shaft, shaft broadened in apical portion in caudoventral view. Paraphyses symmetrical, arms widely separated at base.

Female abdominal sternum VII strongly sclerotized (appearing strikingly black in dried specimens) except laterobasally, moderately produced posteriorly, posterior margin truncate with a shallow median concavity that bears a blunt tooth. Ovipositor with second valvula broadened in most of length beyond basal curvature, its dorsal margin convex and bearing slanted primary teeth each bearing minute secondary denticles and with anteapical dorsal and ventral minute denticles before narrowly rounded apex. Pygofer angulate dorsoapically and with a number of macrosetae on posterodorsal portion.

Inuyana occurs in Peru and southwestern Brazil. Species are similar in many respects to those of *Erythrogonia* Melichar in the treatment of which distinguishing characters are discussed. My interpretation of *Cicadella pendulosa* Osborn is based on paratypes in CM.

SPECIES OF *INUYANA*

devia, n. sp. Peru.
juninensis, n. sp. Peru.
pendulosa (Osborn), 1926b:206 *(Cicadella)*. SW. Brazil. New combination.
ucaya, n. sp. Peru.

KEY TO MALES OF *INUYANA*

1. Head with an apical black spot, without a process on first segment of anal tube on each side ..... *pendulosa* (Osborn) (fig. 636)
   Head without apical black spot, with a process on first segment of anal tube on each side 2
2. Head with a large dorsal black spot on each side of apex, plates extending as far posteriorly as pygofer apex ..... *ucaya*, n. sp.
   Head with a broad basal transverse black band, without spots, plates not extending posteriorly as far as pygofer apex 3
3. Anal process slender, elongate, with a short branch
   juninensis, n. sp., page 781
   Anal process much shorter (fig. 637*p*), without a branch
   devia, n. sp., page 784

Inuyana ucaya, NEW SPECIES

FIGURE 634, PAGE 781

Length of male 8.4-8.6 mm, of female 8.1-8.7 mm. Head with median length of crown slightly more than half interocular width and approximately one-third transocular width, ocelli located slightly behind a line between anterior eye angles, transclypeal suture obscure medially; forewing with base of fourth apical cell coriaceous, apices of anteapical cells not or only in small part membranous. Male pygofer less strongly produced than in other species of the genus and not narrowed as much; anal tube with a slender aciculate process, directed ventrally, on each side of segment X; style with a distinct preapical lobe; aedeagal shaft without processes, ventral margin with a somewhat variable anteapical convexity, with paired very short decurved processes at apex of shaft; paraphyses consisting of a slender transverse basal piece from the lateral extremities of which a pair of aciculate rami extend posteriorly. Female genital chamber with a large median and two smaller lateral sclerites in its dorsal wall; other female characters as in generic description.

Color of crown and pronotum pale yellow, with a pair of conspicuous black spots extending forward from ocelli, over onto clypeus, delimited laterally on crown by lateral clypeal sutures; forewings pale pink basally, darker reddish just before apical cells; lower portion of face, thoracic pleura, venter, legs, and venter of abdomen, dull orange-yellow, except male plates and female abdominal sternum VII which are black.

Holotype male, and one female Pichis ["Piches"] and Perené Valleys, Peru, 2000-3000 ft. The specimens are also labeled "Soc. Georg. de Lima"

(USNM). Five males and five females, "Tambo Enenas to Dos de Mayo", Cam[ino] del Pichis, Peru, July 4, July 5, and July 20, 1920 (CU).

In structure of the male genitalia, *Inuyana ucaya,* n. sp., is similar to *I. juninensis,* n. sp., but it may be recognized readily by the paired black spots on the head, and by the lack of a branch on each of the paraphyses, both differing from *juninensis.*

Inuyana juninensis, NEW SPECIES

FIGURE 635, PAGE 782

Length of male 7.7-8.4 mm, of female 8.0 mm. Head with median length of crown varying from approximately one-half to approximately six-tenths interocular width, and from three-tenths to approximately four-tenths transocular width, ocelli located slightly behind a line between anterior eye angles, transclypeal suture obscure medially; forewing with base of fourth apical cell

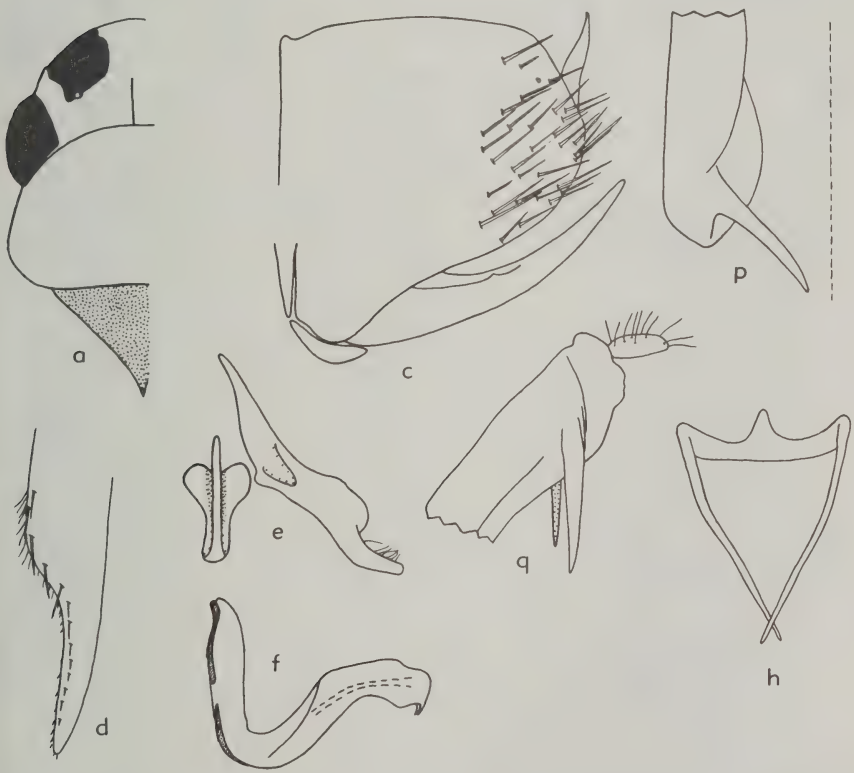


FIGURE 634.—*Inuyana ucaya,* n. sp. (from specimen from Camino del Pichis, Peru (*h* from caudoventral view): *p,* Male pygofer, right side, from ventral view; *q,* anal tube from lateral view.

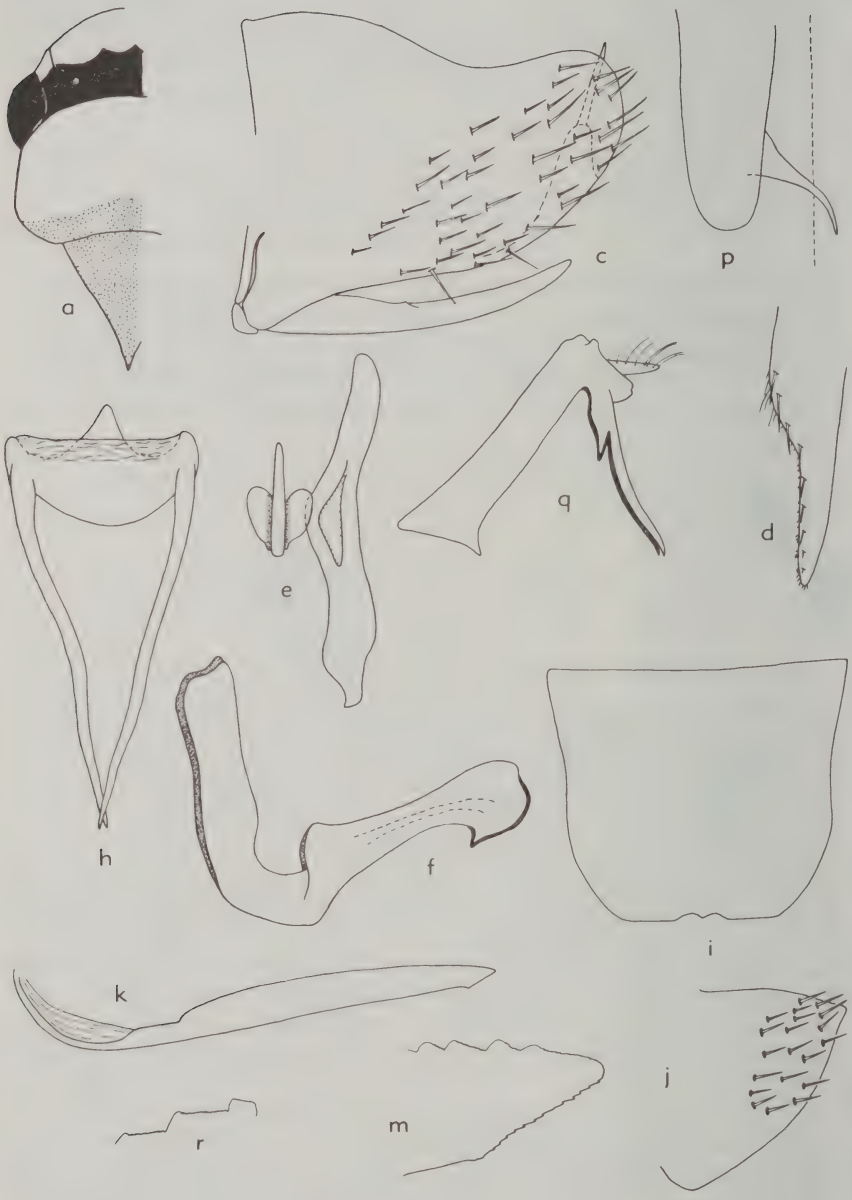


FIGURE 635.—*Inuyana juninensis*, n. sp. (*i-k*, *m*, *r*, from topotype, remainder from holotype; *h* from dorsal view): *p*, Male pygofer process, left side, from caudal view; *q*, anal tube of male; *r*, teeth near base of second valvula.

coriaceous, apices of inner two anteapical cells membranous. Male pygofer well produced, more narrowed apically than *I. ucaya,* n. sp.; anal tube with an elongate slender basal aciculate process on each side, bearing a short branch in its basal half; aedeagal shaft without processes, ventral margin concave, apex with a pair of very short angulate processes directed ventrally; paraphyses as in *ucaya*.

Crown of head with a broad black interocular transverse stripe with its anterior margin irregular; pronotum pale yellow with a transverse stripe along posterior margin, castaneous and concolorous with scutellum and longitudinal band along commissural margin of each wing to claval apex, with a broad brownish translucent marginal band along costal margin, remainder of anteapical portion of wing yellowish near base, becoming pink apically and red before apical cells in some specimens; face, venter, and legs, as in *ucaya*.

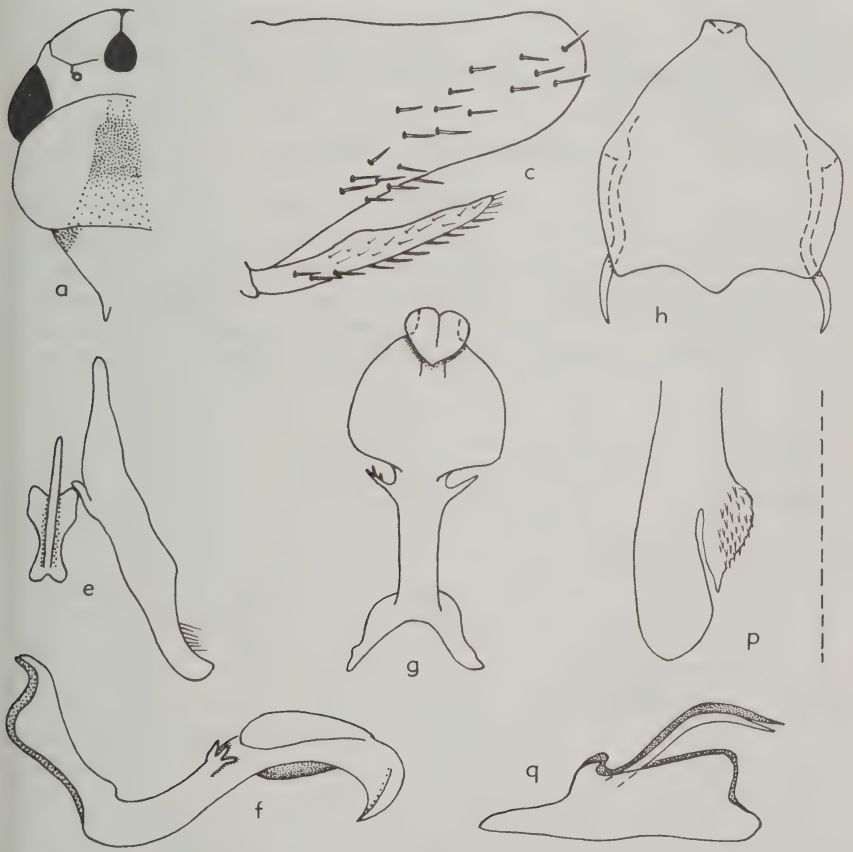


FIGURE 636.—*Inuyana pendulosa* (Osborn) (from paratype from Rio Guaporé, Brazil; *h* from ventral view): *p,* Male pygofer apex, right side, from ventral view; *q,* paraphyses from lateral view.

Holotype and two additional males and one female, Chanchamayo, Peru, July 22, 1960 (J. Salazar); one male and five females, same data, and collected on Royal Fern; one male and eight females, same data as preceding except collected on Gramineae, one female, same locality, July 21, 1960 (J. Salazar); three males and two females, same data as preceding, and collected on "Marco-Marco"; one female, same locality, July 21, 1960 (D. A. Young); five females, same locality, July 21, 1960 (Young and Salazar); one male and two females, same locality, (Salazar and C. Ramirez), on squash; one male and five females, same locality, July 22, 1960 (Young and Salazar); seven males and eighteen females, same locality, July 22, 1960 (J. Salazar and C. Ramirez); five males and twelve females, same locality, July 25, 1960 (Young and Ramirez); one male and five females, same locality, July 25, 1960 (Salazar and Ramirez); ten males and seven females, same locality, July 25, 1960 (Young and Salazar) (NCS). One male, "Peru" (BM). Holotype on indefinite loan to USNM.

The transverse black coronal stripe will separate *juninensis* from *ucaya*. The longer, branched anal processes and the small paired apicoventral angular aedeagal projections will separate *juninensis* from *I. devia*, n. sp.

Inuyana devia, NEW SPECIES

FIGURE 637

Length of male 7.9 mm. Head with median length of crown approximately six-tenths interocular width, and approximately four-tenths transocular width, ocelli located slightly behind a line between anterior eye angles, transclypeal suture obscure medially; forewing with base of fourth apical cell membranous, apices of inner two anteapical cells membranous. Male pygofer and plates

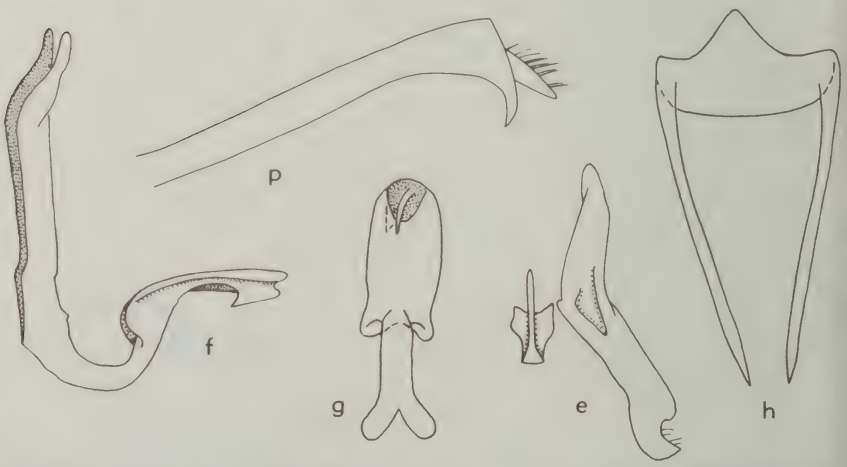


FIGURE 637.—*Inuyana devia*, n. sp., holotype (*h* from ventral view): *p*, Male anal tube from lateral view.

much as in *I. juninensis,* n. sp.; anal tube with a slender acute process at apex of segment X; style with a distinct preapical lobe; aedeagal shaft becoming abruptly wider near midlength in ventral view, with a short median unpaired acute process; paraphyses as in *I. ucaya,* n. sp.

Color as in *juninensis* but with transverse castaneous submarginal stripe of pronotum bordered with black anteriorly and with commissural stripe of forewing changing gradually to red posteriorly; face, thoracic pleura, venter, and legs, dull brown.

Holotype male (pygofer missing), Oxapamba, Peru (USNM).

I. devia, n. sp., is closely similar to *juninensis,* in the discussion of which distinguishing characters are treated.

104. TETTISAMA, NEW GENUS

FIGURES 638, 639

Type-species: *Tettigonia bisellata* Signoret.

Length of male 10.5-10.9 mm, of female 10.0-12.0 mm.

Head with crown moderately produced, its median length from one-half to more than six-tenths interocular width and from one-third to slightly more than four-tenths transocular width, anterior margin regularly convex in dorsal view, without a carina at transition from crown to face, ocelli located slightly closer to adjacent eye angle than to median line of crown, surface convex except for shallow concavity between ocelli, without sculpturing or setae, lateral clypeal sutures extending onto crown and usually attaining ocelli; antennal ledges each with anterior margin obliquely convex in lateral view; face slightly flattened medially, muscle impressions not very distinct, lower portion of clypellus weakly pubescent, transclypeal suture usually interrupted medially.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae rectilinear, nearly horizontal, complete or nearly so, hind margin broadly, shallowly concave, disk without sculpturing or pubescence; scutellum not striate. Forewing with membrane of variable extent, often not sharply delimited at base, veins not elevated, usually not very distinct, with four apical cells of which base of fourth is more proximal than base of third, without a plexus of veins, texture coriaceous, without sculpturing; female with forewings in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, first tarsomere with length greater than combined length of second and third tarsomeres, with two longitudinal rows of minute setae on plantar surface.

Male genitalia: Pygofer moderately produced, dorsal margin with a narrow anteapical emargination delimiting an apical undifferentially sclerotized subquadrate lobe, macrosetae sparse, of mixed lengths and located on disk before lobe. Plates separate throughout their length, each narrowly triangular, rounded apically, with uniseriate macrosetae (occasionally with one or a few setae out of line). Style extending posteriorly farther than apex of connective, with slight lobe near midlength, apical portion abruptly narrowed to angulate tip which is directed mesally. Connective linear, strongly keeled. Aedeagus

symmetrical, not articulated with connective, slender, tubular and curved dorsad through 90° in lateral view, without processes. Paraphyses present, symmetrical, consisting of a broad transverse basal portion from each lateral extremity of which a slender tapering ramus extends posteriorly.

Female abdominal sternum VII heavily sclerotized except basally, posterior margin concave. Dorsal membrane of genital chamber with four sclerites arranged in a transverse row. Ovipositor with second valvulae narrow in their basal portions, expanded beyond their basal curvature and with quadrate primary teeth which bear minute secondaries, dorsal margin of toothed portion fairly strongly convex. Pygofer with few sparse macrosetae parallel to posteroventral margin and on disk anteapically.

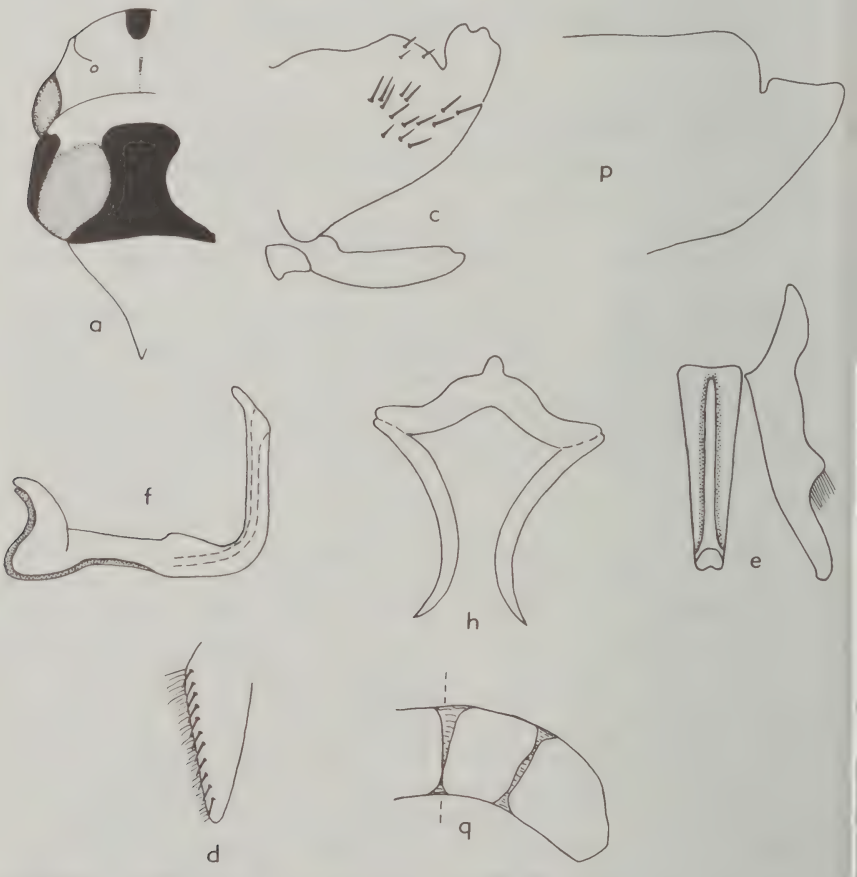


FIGURE 638.—*Tettisama quinquemaculata* (Germar) (*p*, from specimen from Bahia, Brazil; *q* from Mato Grosso, Brazil; remainder from Misiones, Argentina; *h* from dorsal view): *p*, Male pygofer, posterodorsal portion, setae not shown, *q*, sclerites in dorsal wall of genital chamber, from dorsal view.

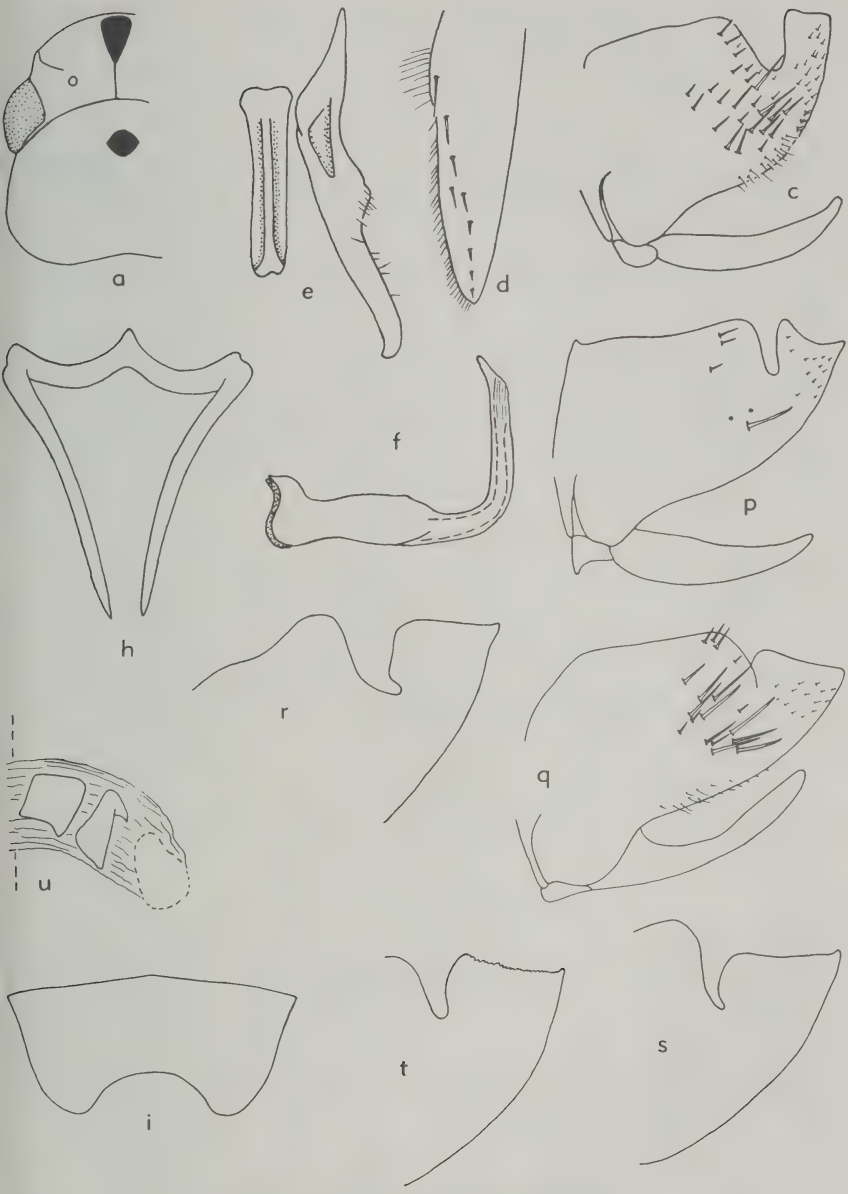


FIGURE 639.—*Tettisama bisellata* (Signoret) (*i* from lectotype of *Tettigoniella dilectula* Jacobi; *p* from specimen from Pachitea River, Peru; *q* from "Amazonas"; *r* from Rio Guaporé, Brazil; *s-u*, from Provincia del Sara, Bolivia; remainder from Ecuador; *h* from dorsal view; *p*, typical): *q*, Male pygofer from lateral view; *r-t*, outline of apical portion of same; *u*, sclerites in dorsal wall of genital chamber.

Specimens of *Tettisama*, new genus, have been examined from Colombia and British and Dutch Guiana to Bolivia, Paraguay, and Argentina. *Tettisama* is related to *Erythrogonia* Melichar, but specimens are longer (at least 10 mm vs. 9.2 mm at most), and males have the distinctive pygofer lobe not found in *Erythrogonia*.

The present interpretation of *Tettigonia sexpustulata* Stål rests on the original description and agrees with specimens so identified by Melichar. Types of this species were not found by the writer during studies in Europe.

The identity of *Tettisama quinquemaculata* (Germar) as here determined rests on the original description. I have examined the lectotype of *Tettigonia subsignata* Walker.

There appear to be two doubtfully distinct species of *Tettisama*, each with a great deal of color variation, and possibly a third undescribed species from Bolivia, of which only three females have been seen. The male genitalia of the known species do not yield specific characters, and the writer has been unable to find characters other than color to separate them. Medler (1963a:21) correctly excluded the nominal species from *Erythrogonia*.

SPECIES OF *TETTISAMA*

(Types of nominal species marked with an asterisk have not been studied)

bisellata (Signoret), 1862a:586 (*Tettigonia*). Colombia, Br. and Fr. Guiana, NE. and SW. Brazil, Ecuador to Bolivia. New combination.

dilectula (Jacobi), 1905c:174 (*Tettigoniella*). New synonymy.

**quinquemaculata* (Germar), 1821a:67 (*Tettigonia*). D. Guiana; N., E., and SE. Brazil, Paraguay, Argentina. New combination.

mutabilis (Signoret), 1853c:683 (*Tettigonia*).

**sexpustulata* (Stål), 1855b:192 (*Tettigonia*).

bifacies (Walker), 1858b:213 (*Tettigonia*).

**obscura* (Stål), 1862b:496 (*Tettigonia quinquemaculata* var.).

subsignata (Walker), 1858a:96 (*Tettigonia*). New synonymy.

KEY TO SPECIES OF *TETTISAMA*

Forewing without spots or with two spots of which anterior one is oval and does not attain commissural margin, neither two anterior spots nor two posterior spots of two forewings at rest appearing as a transcommissural band ..... *quinquemaculata* (Germar) (fig. 638)

Forewing with two spots, the more anterior one quadrate and attaining commissural margin, both pairs of spots of two forewings in rest position appearing as transcommissural bands ..... *bisellata* (Signoret) (fig. 639)

105. AGUATALA, NEW GENUS

FIGURE 640

Type-species: *Aguatala compsa*, new species.

Length of male 8.4 mm (female unknown).

Head moderately produced, with anterior margin broadly rounded in dorsal view, median length of crown more than six-tenths interocular width and

slightly less than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, disk of crown with a slight transverse concavity across ocelli, surface of crown without sculpturing, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with their anterior margins oblique and rectilinear; clypeus convex medially, muscle impressions not distinct, clypellus with contour of its lower portion slightly more nearly horizontal than profile of remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae not complete, disk without sculpturing, posterior margin shallowly concave, scutellum not rugose behind transverse sulcus. Forewing with membrane including inner two apical cells and apical portions of remaining apical cells, with three closed anteapical cells of which the bases are proximal to the claval apex, and four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced with apical margin broadly convex, macrosetae numerous, located on posterior half of disk, without processes. Plates short, slender, triangular, gradually tapering, not extending posteriorly as far as pygofer apex, each with uniseriate small macrosetae. Style extending posteriorly as far as apex of connective, narrowly rounded at apex, with a preapical lobe. Connective narrowly Y-shaped. Aedeagus with

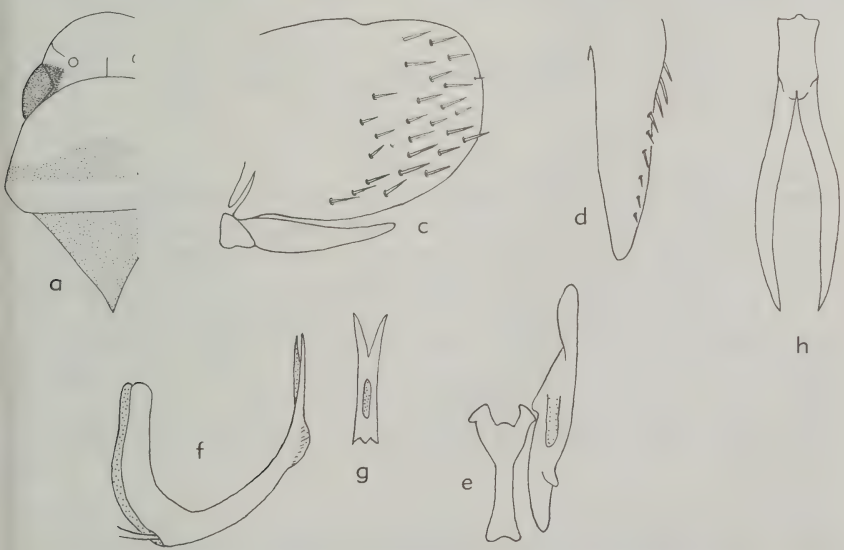


FIGURE 640.—*Aguatala compsa*, n. sp., holotype (only aedeagal apex shown in *g*, *h* from dorsal view).

shaft slender, curved gradually dorsally, with a pair of slender acute dorsoapical processes. Paraphyses with rami narrow, scarcely stalked, slender, elongate, tapered, acute.

Female unknown.

Aguatala, new genus, is known only from the type-species, from Venezuela (?). In form, *Aguatala* resembles *Erythrogonia* species to some extent, but is more robust. The male plates are similar to many *Erythrogonia*, also.

Aguatala compsa, NEW SPECIES

FIGURE 640

Structural characters as in generic description.

Head and pronotum sordid yellow, with a narrow transverse purple stripe across posterior half of pronotum; scutellum purple; forewings sordid yellow with a purple spot near transcommissural margin on each clavus and a semicircular purple arc on each wing meeting its complement posteriorly at claval apex but narrowly failing to reach the commissural margin near scutellar apex, the anterior extremities of each arc connected with the smaller claval spot, the posterior extremities so connected (holotype) or not; a black spot before apical membrane; upper portion of clypeus and median portion of clypellus concolorous with crown, remainder of face black except narrow pale margins of genae; propleura pale, remainder of thoracic pleura and venter brown; legs concolorous with crown except pale brown posterior tibiae and tarsi.

Holotype male, Alto de las Cruces [Venezuela?] and one additional male, Rio Aguatal [Venezuela?] (MMB).

106. TORRESABELA, NEW GENUS

FIGURE 641

Type-species: *Tettigonia fairmairei* Signoret.

Head moderately produced, median length of crown varying from one-half to approximately two-thirds interocular width and from one-third to four-tenths transocular width, without a carina at transition from crown to face, ocelli located slightly before a line between anterior eye angles, each approximately equidistant from median line and adjacent anterior eye angle, disk with a slight transverse concavity between ocelli, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledge with anterior margin obliquely convex in lateral view; face convex, clypeus with muscle impressions distinct, clypellus with contour of its lower portion more nearly horizontal than profile of remainder of face, weakly pubescent.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly; dorsopleural carinae incomplete, posterior pronotal margin concave, disk of pronotum not or weakly transversely rugose. Forewing with membrane including all of apical cells, a short portion of costal

area, and narrow apical portion of middle anteapical cell, veins not distinct, not elevated, opaque, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, wings of female at rest exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, first tarsomere with length greater than combined length of two more distal tarsomeres and with two rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced with apex slightly concave above base of a short curved apical acute process that extends dorsad, with a vertical narrow group of macrosetae on apical half of disk. Plates extending posteriorly as far as pygofer apex, slender, triangular, fused basally, with multiseriate short, macrosetae. Style slender, extending posteriorly beyond apex of

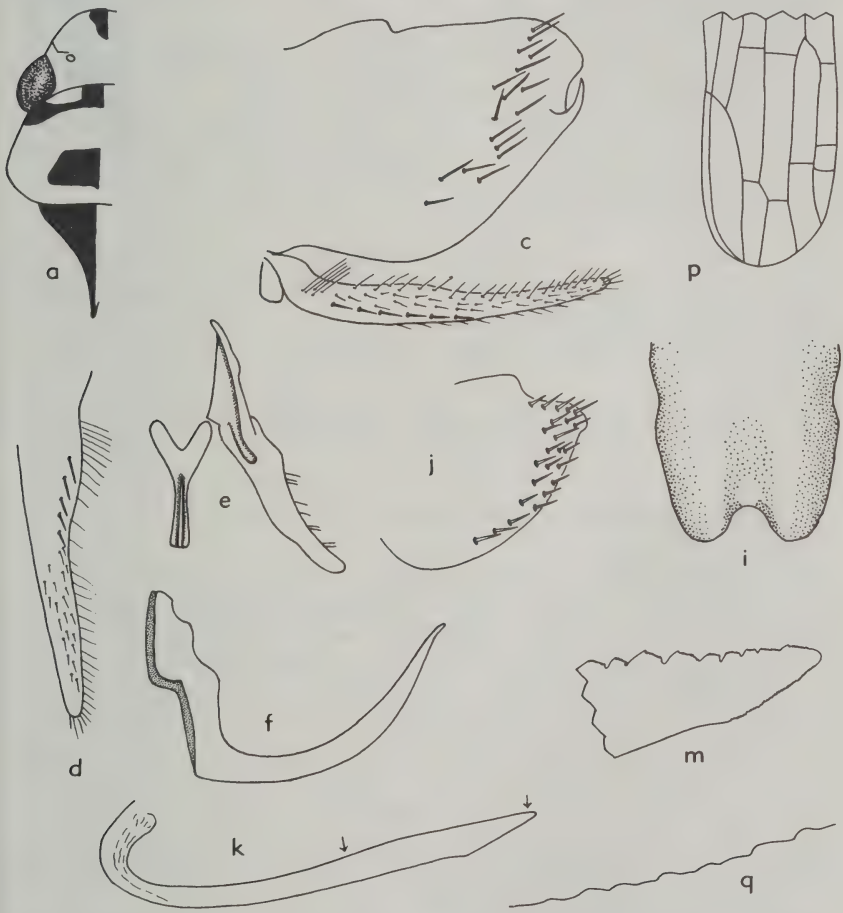


FIGURE 641.—*Torresabela fairemairei* (Osborn) (*c-f* from holotype of *Cicadella corallina* Osborn; *a* from specimen from Venezuela; remainder from specimen from São Paulo, Brazil; arrows showing limits of toothed area in *k*): *p*, Apex of forewing; *q*, basalmost teeth of second valvula.

connective, rounded apically, with a number of microsetae on apical half, without a preapical lobe. Connective narrowly Y-shaped, with stem longer than arms. Aedeagus slender, curved gradually dorsad and gradually narrowed to acute apex, gonopore anteapical and ventral. Paraphyses absent.

Female abdominal sternum VII with apical margin concavely emarginate medially; pygofer with macrosetae grouped parallel to and near posterior margin. Genital chamber without sclerites in the membrane. Second valvulae with dorsal margins not strongly convex, toothed only on apical half, the teeth poorly defined at base of toothed portion, irregular but larger and bearing minute secondary denticles in more apical portion of dorsal margin, each valvula gradually tapered to narrowly rounded apex, with anteapical dorsal and ventral denticles.

Specimens of *Torresabela fairmairei* (Signoret), the only known species, are dark red with the ground color of the pronotum and large spots on forewings, yellow. The species occurs on *Nymphaea* sp.

Torresabela, new genus, is placed in the *Erythrogonia* generic group, within which it forms a complex with the new genera *Aguahua*, *Kapateira*, and *Nielsonia*. The concave posterior margin of abdominal sternum VII of the female will separate *Torresabela* readily from these genera.

SPECIES OF *TORRESABELA*

fairmairei (Signoret), 1853c:685 (*Tettigonia*). Venezuela, Ecuador, Bolivia, Brazil, Paraguay, Argentina. New combination.

corallina (Osborn), 1926b:206 (*Cicadella*). New synonymy.

107. AGUAHUA, NEW GENUS

FIGURE 642

Type-species: *Tettigonia salamandra* Signoret (1855d:787).

Length 9.0-10.1 mm.

Head slightly produced, median length of crown varying from one-half to almost seven-tenths interocular width and from approximately one-third to slightly more than four-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, crown with a transverse concavity across ocelli, surface without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus convex, muscle impressions distinct, transclypeal suture obsolete medially, clypellus in profile with its lower portion more nearly horizontal than remainder of face, densely pubescent (but often rubbed).

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae almost complete, posterior margin shallowly concave, disk transversely rugose, not pubescent; scutellum not transversely rugose behind transverse sulcus. Forewing with membrane including only inner apical cell, veins elevated and distinct, with three closed

anteapical cells of which bases are all more proximal than claval apex, with four very short apical cells of which base of fourth is usually more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1; length of first tarsomere approximately equal to combined length of two more distal tarsomeres, and with numerous irregularly arranged setae.

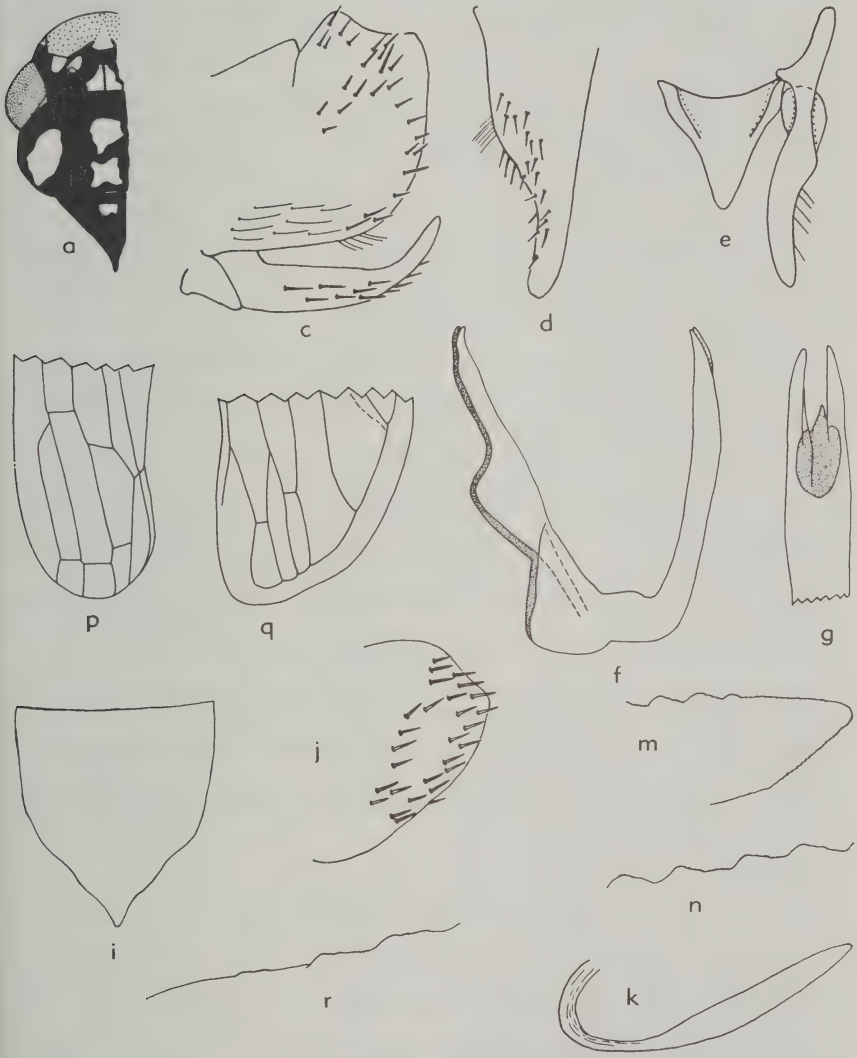


FIGURE 642.—*Aguahua salamandra* (Signoret) (*c-g* from specimen from Mérida, Venezuela; remainder from specimens from Venezuela; only aedeagal apex shown in *g*): *p*, Forewing apex; *q*, hindwing apex; *r*, basalmost teeth of second valvula.

Male genitalia: Pygofer moderately produced, anteapical dorsal margin slightly concave, posterior margin broadly convex, macrosetae few, extending in two groups from middle of disk, one dorsally, the other ventrally along caudal pygofer margin, with a group of long microsetae near ventral margin. Plates elongate triangular, not extending posteriorly as far as pygofer apex, with multiseriate macrosetae. Style extending posteriorly beyond apex of connective, without preapical lobe. Connective triangular. Aedeagus slender, elongate, with elongate dorsal apodemes, shaft extending posterodorsally, slightly bifid apically; gonopore ventral and slightly anteapical. Paraphyses absent.

Female abdominal sternum VII with posterior margin subangularly produced, narrowly rounded apically. Ovipositor with second valvulae expanded, each with broad quadrate primary teeth on apical two-thirds of dorsal margin beyond basal curvature almost to apex, each of the primaries with a number of small secondaries, with a number of minute anteapical dorsal and ventral denticles before narrowly rounded apex, ventral margin convex. Pygofer with posterior margin convex, disk with numerous irregularly arranged small macrosetae on posterior half.

There is much variation in color in *A. salamandra* (Signoret).

Aguahua, new genus, is known only from the type-species, which occurs in French Guiana, Venezuela, Colombia, and Bolivia. *A. salamandra* (Signoret) is similar in size and general appearance to some species of *Stehlikiana*, new genus, but males differ markedly in the more slender aedeagus, and females in the more extensive toothed portion of the second valvulae of the ovipositor and the lack of an emargination on the posteroventral pygofer margin. *Aguahua* is placed near *Kapateira*, new genus and to *Nielsonia*, new genus, because of similarity in general appearance and in the second valvulae of the ovipositor. The similarity in both male and female genital structures between *Aguahua* and *Selvitsa*, new genus, indicate a relationship of the *Oragua* group of genera to *Nielsonia, Kapateira* and their related genera.

My interpretation of *Tettigonia salamandra* (Signoret) is based on a comparison of the male illustrations here with the lectotype.

Early in this study I misdetermined dull greenish-tan specimens of *salamandra* as *A. rosipennis* (Osborn), and unfortunately a number of these were returned to the institutions which loaned them. The Osborn species does not belong in *Aguahua*.

108. NIELSONIA, NEW GENUS

FIGURES 643-646

Type-species: *Nielsonia praestigia,* new species.

Length 8.4-10.6 mm.

Head moderately produced, median length of crown varying from slightly more than one-half to slightly more than seven-tenths interocular width and from one-third to almost one-half transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles, each

slightly closer to adjacent anterior eye angle than to median line of crown, crown with a distinct concavity across ocelli, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus convex or slightly flattened, usually finely granulate medially, muscle impressions distinct, transclypeal suture obscure medially, clypellus in profile with its lower portion more nearly horizontal than remainder of face, not or very weakly pubescent apically.

Thorax with pronotal width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk nearly always without sculpturing, without pubescence; scutellum not transversely rugulose. Forewing with membrane including all, or almost all of apical cells and extending proximally a short distance along costal margin, with three closed anteapical cells of which the bases are all proximal to claval apex, the middle one longest, texture coriaceous, weakly transversely rugulose; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, first tarsomere slightly longer than combined length of more distal tarsomeres and with two parallel asymmetrical rows of small setae on plantar surface.

Male genitalia: Pygofer not strongly produced, posterior margin varying from slightly convex to shallowly concave, with numerous macrosetae on posterior half of disk, occasionally with interspersed microsetae, pygofer processes present or absent, variable interspecifically when present. Plates narrowly triangular, extending posteriorly beyond apex of pygofer, with uniseriate macrosetae. Style extending posteriorly beyond apex of connective, without preapical lobe. Connective broadly U- or Y-shaped. Aedeagus variable interspecifically, asymmetrical with an unpaired basal process, basal apodemes greatly elongate. Paraphyses absent. Abdomen of male with short but distinct ventral basal apodemes.

Female abdominal sternum VII moderately produced posteriorly, posterior margin obtusely angular or subangular. Ovipositor with second valvulae each broadened and bearing primary teeth on dorsal margin in most of length beyond basal curvature, the primaries quadrate and bearing secondary denticles, apex not very acute, with anteapical dorsal and ventral denticles, ventral margin concave in toothed portion. Pygofer slightly produced and convex apically, with numerous macrosetae of uniform size on apical half.

All of the species are dull yellow on crown, pronotum, and scutellum, with forewings and often posterior portion of pronotum darker. All have black spots or lines on the dorsum of the head and thorax.

Nielsonia occurs in Costa Rica, Panama, and Ecuador. Species are similar in appearance to species of *Kapateira,* new genus, but in the males the pygofer is shorter and the connective is longer than in the latter genus, and the aedeagus is asymmetrical. The male genitalia of *Nielsonia* are similar to those of *Macunolla intorta*, n. sp., (p. 803), also, and to those of the new genus *Stephanolla*. Distinguishing characters are discussed in the treatment of *Stephanolla*.

N. rostris, n. sp., has been collected on coffee (see below).

Nielsonia is named in honor of M. W. Nielson, who has contributed much to our knowledge of leafhopper systematics.

SPECIES OF *NIELSONIA*

praestigia, n. sp. Panama.
pretensa, n. sp. Panama.
rostris, n. sp. Costa Rica.
scissa, n. sp. Panama, Ecuador.

KEY TO MALES OF *NIELSONIA*

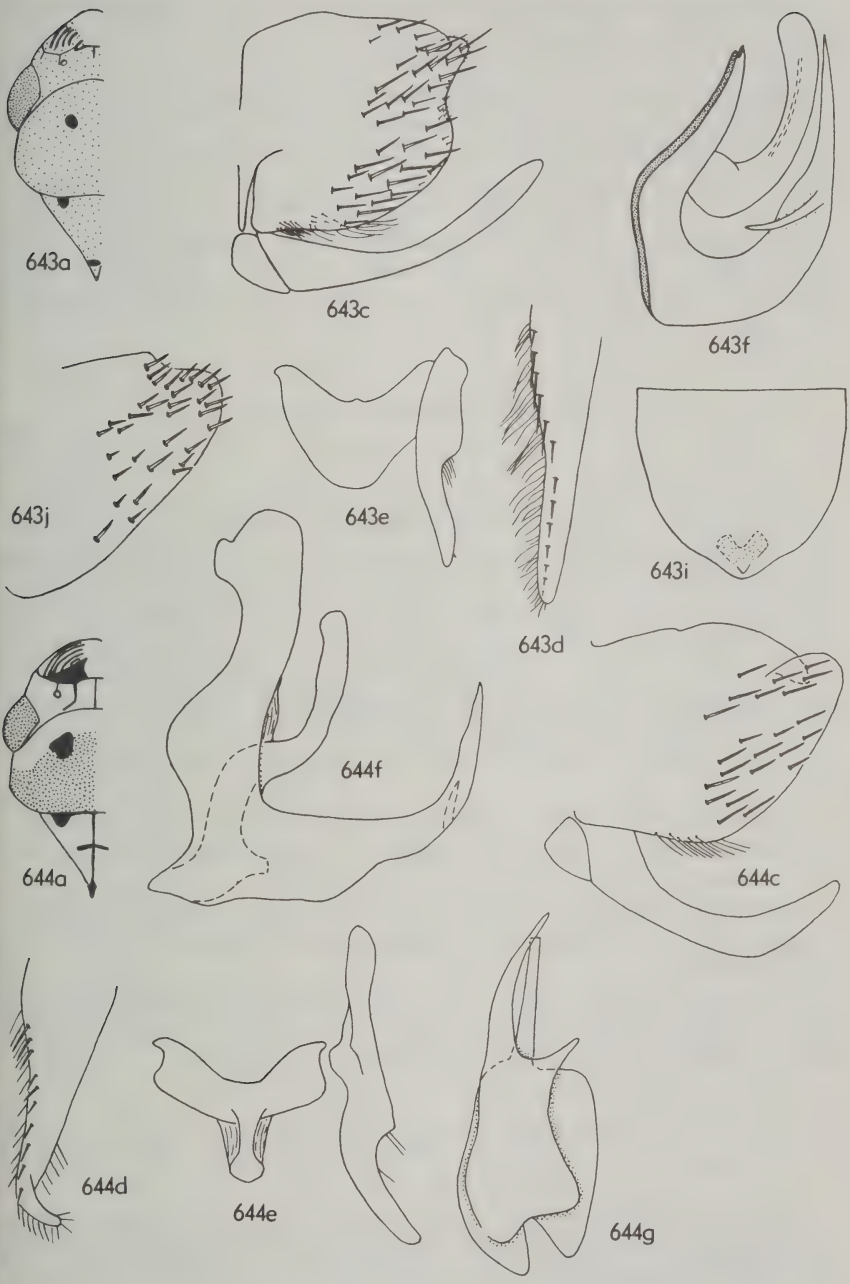
1. Ventral aedeagal process with a smaller process near midlength 2
   Ventral aedeagal process without a smaller process 3
2. Smaller aedeagal process retrorse; larger process more strongly curved (fig. 643*f*) ..... *rostris*, n. sp.
   Smaller aedeagal process not retrorse; larger process less strongly curved (fig. 644*f*) ..... *scissa*, n. sp., page 798
3. Aedeagal shaft strongly curved, its ventral process not extending to its apex ..... *pretensa*, n. sp., page 798
   Aedeagal shaft less strongly curved, its ventral process extending to or near its apex ..... *praestigia*, n. sp., page 800

Nielsonia rostris, NEW SPECIES

FIGURE 643, PAGE 797

Length of male 9.6-10.6 mm, of female 10.0 mm. Head with median length of crown varying from slightly more than one-half to almost two-thirds interocular width and from one-third to slightly more than four-tenths transocular width. Male pygofer with posterior margin very slightly concave below apex, with a short dorsal unsclerotized process directed posteriorly but not attaining apex of pygofer; connective short Y-shaped; aedeagus with shaft well separated basally from ventral process which arises from ventral portion of atrium, curves dorsally close to shaft in lateral view, its apical half acuminate, and bears a short retrorse acute smaller process at its midlength. Female genitalia as in generic description.

Color of crown except at apex, anterior portion of pronotum, and scutellum, dull yellow, apex of crown either contrasting pale yellow, or black, posterior two-thirds of pronotum tan or purplish; with a pair of angulate black spots or a pair of arcs on crown at upper margin of muscle impressions, often connected across median line by a black line; a pair of round black spots on disk of pronotum before its midlength; a pair of subangular black spots on base of scutellum and a black spot before its apex; clypeus entirely and often clypellus entirely or partly castaneous suffused with black to a varying degree; thoracic pleura dull yellow to tan except lower portion of mesothoracic anepisternum and all of katepisternum which are dark brown to black, metepisternum black; legs tan.



FIGURES 643, 644.—643, *Nielsonia rostris,* n. sp., (*i, j,* from topotype, remainder from holotype). 644, *N. scissa,* n. sp., holotype.

Holotype and two additional males and five females, San Pedro de Montes de Oca, Costa Rica, December, 1936 (C. H. Ballou) "No. 417"; nine males and eight females, same data as preceding except date, February - May 1935; five females, same data as holotype except date, August 9, 1934, and host, "on coffee"; and one female, Las Cruces, near San Vito, Costa Rica, March 19-20, 1965 (S. and W. D. Duckworth) (USNM). Five males, San José, Costa Rica (H. Schmidt); one male, Pacific side, Costa Rica (H. Schmidt) (ZIMH).

N. rostris, n. sp., is closer, in the structure of the male genitalia, to N. *scissa,* n. sp., than to other species in the genus, but can be separated readily by the retrorse short branch of the ventral aedeagal process, and by the wider separation of the base of the shaft from the ventral process, both of which differ in *scissa.*

Nielsonia scissa, NEW SPECIES

FIGURE 644, PAGE 797

Length of male 8.4-8.7 mm, of female 8.9 mm. Head with median length of crown varying from slightly more than six-tenths to slightly more than seven-tenths interocular width and from approximately four-tenths to slightly less than one-half transocular width. Male pygofer with posterior margin slightly convex below apex, dorsal process as in *N. rostris,* n. sp.; connective as in *rostris;* aedeagus with shaft closely associated basally with base of ventral process which arises from ventral portion of atrium, extends posteriorly in its basal half, curves dorsad and tapers in its apical half, and bears a short acute smaller process near its midlength, as in *rostris,* but not retrorse, the longer process not close to the shaft in lateral view, shaft with curvature less than in *rostris.*

Color as in *N. rostris,* n. sp., but with two spots on crown before ocelli large, and face with black markings consisting of a variable area on clypeus, two spots at apex of clypellus, and lateral clypeal sutures.

Holotype and one additional male and two females, Guayaquil, Ecuador; holotype 1941 (C. L. Fagan); other three specimens February 20, 1950 (S. W. Frost) (USNM).

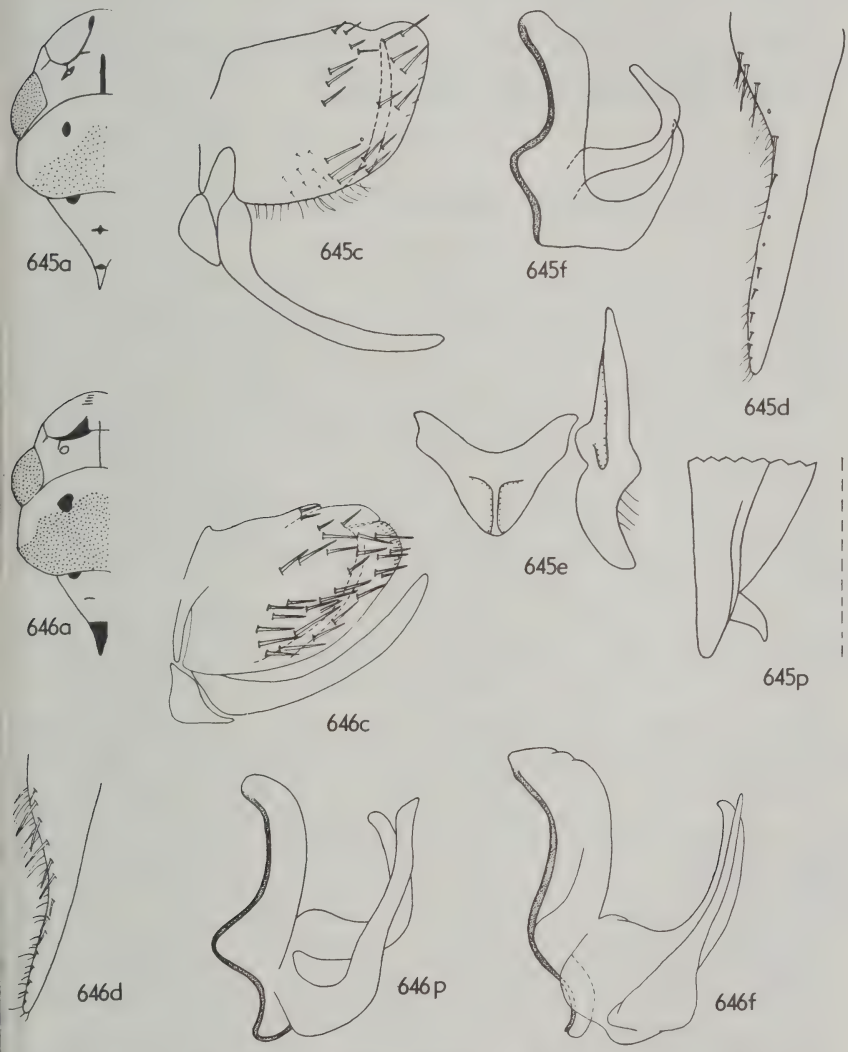
N. scissa, n. sp., is closer to *N. rostris* than to other species in the genus, but differs in the form of the ventral aedeagal process and the smaller process it bears, as well as in the less arcuate form of the aedeagus.

Nielsonia pretensa, NEW SPECIES

FIGURE 645, PAGE 799

Length of male 8.7-9.0 mm. Head with median length of crown varying from slightly less than two-thirds to approximately seven-tenths interocular width and from slightly more than four-tenths to slightly less than one-half transocular width. Male pygofer with posterior margin oblique and almost rectilinear below apex, with a short dorsal anteapical heavily sclerotized process directed posteromesally, not attaining apex of pygofer, and with a

sclerotized rod as in *N. praestigia*, n. sp.; aedeagus with base closely associated with ventral aedeagal process, shaft more strongly curved than in other species of the genus, ventral process not extending dorsally as far as aedeagal apex, gradually narrowed in apical half and not bearing a smaller process, atrium not bearing processes on its lower portion. Female unknown.



FIGURES 645, 646.—645, *Nielsonia pretensa*, n. sp. (from specimen from Panama): *p*, Male pygofer apex, right side, from ventral view. 646, *N. praestigia*, n. sp. (*a* from specimen from Chica, Panama Province; *p*, from Madden Dam, Panama Canal Zone; remainder from Panama): *p*, Aedeagus from lateral view.

Color much as in *N. rostris*, n. sp., but with an arcuate black line on each side on crown and a median scutellar black spot; face and katepisternum of mesothorax pale.

Holotype male, Salud, Panama, August 20, 1952 (F. S. Blanton); four males, "Far Fam.", Panama Canal Zone, December 21, 1956 (F. S. Blanton); one male Galeta Point, Panama, December 14, 1956 (F. S. Blanton) (USNM).

N. pretensa, n. sp., is very similar to *N. praestigia* but differs in its shorter ventral aedeagal process, the much more strongly curved aedeagal shaft, and in the heavily sclerotized dorsal pygofer process.

Nielsonia praestigia, NEW SPECIES

FIGURE 646, PAGE 799

Length of male 8.4-8.9 mm, of female 8.4-9.2 mm. Head with median length of crown varying from six-tenths to two-thirds interocular width and from one-third to slightly more than four-tenths transocular width. Male pygofer with posterior margin convex, with dorsal unsclerotized process as in *N. rostris*, n. sp., with an arcuate vertical sclerotized rod on internal surface of cuticula extending subparallel to posterior pygofer margin; aedeagus with base of shaft closely associated with base of ventral process, shaft not as strongly curved as in *rostris*, ventral process extending dorsally parallel to shaft, narrowed in its basal half and not bearing a smaller process, atrium bearing a pair of short curved processes directed ventrad from its lower portion. Female genitalia as in generic description.

Color much as in *N. rostris* but with face more variable, usually less darkened than in *rostris*, often with only a portion of middle of clypeus dark, rarely with only two spots at apex of clypellus and lateral clypeal sutures black.

Holotype and seven additional males and one female, Cerro Campana, Panama Province, Panama, September 19, 1952 (F. S. Blanton); 15 males, Madden Dam, Panama Canal Zone, September 19, 1952 (F. S. Blanton); one female, same data as preceding except date, April 28, 1952; six males, Cerro Azul, Panama, October 3, 1952 (F. S. Blanton); one male, Campinas, Panama, September 19, 1952 (F. S. Blanton); one male, Ft. Sherman, Panama Canal Zone; one male, Ft. Davis, Panama Canal Zone, August 28, 1952 (F. S. Blanton); one female, Pacora, Panama, November 4, 1945 (H. H. Stage); one male Loma Borracha, Canal Zone, July 2, 1952 (F. S. Blanton) (USNM). Twenty-three males and two females, Chica, Panama Province, Panama, June 12, 1967 (D. M. DeLong and C. A. Triplehorn) (OSU).

N. praestigia, n. sp., is closer to *N. pretensa*, n. sp., than to other species in the genus, in the structure of the male genitalia. *N. praestigia* may be separated from *pretensa* by the basiventral processes of the aedeagus, which do not occur in the latter species.

109. MACUNOLLA, NEW GENUS

FIGURES 647, 648

Type-species: *Tettigonia ventralis* Signoret.

Length of male 6.0-6.4 mm, of female 5.8-6.5 mm.

Head moderately produced, median length of crown from slightly more than one-half to slightly more than six-tenths interocular width and from slightly more than one-third to more than four-tenths transocular width, anterior margin narrowly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each usually slightly closer to adjacent anterior eye angle than to median line of crown, crown with a slight transverse concavity before ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins convex and oblique; clypeus broadly convex except flattened medioventral portion, muscle impressions distinct, face without pubescence, transclypeal suture either entire or interrupted medially, clypellus with contour continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave, disk with a broad transverse punctate area across middle; scutellum not rugose behind transverse sulcus. Forewing with membrane including only inner apical cell, veins not very distinct, not elevated, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture translucent and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer short, posterior margin broadly rounded, with a short process on caudoventral margin, with macrosetae of varied sizes on posterior half of disk. Plates not extending nearly as far posteriorly as pygofer apex. Style extending posteriorly beyond apex of connective, without a distinct preapical lobe. Connective Y-shaped, keeled. Aedeagus asymmetrical, shaft with or without processes. Paraphyses asymmetrical.

Female abdominal sternum VII with posterior margin strongly produced and gradually narrowed posteriorly to apex which is rounded or obtusely angulate. Dorsal membrane of genital chamber sclerotized or not (variable interspecifically). Ovipositor with second valvulae each expanded beyond basal curvature and with quadrate primary teeth, each of which bears minute denticles, extending almost to apex of dorsal margin, apex acute, dorsoapical and ventroapical margins without denticles.

Specimens of *Macunolla* have been studied from southern Mexico, British Honduras and Guatemala to Colombia and Ecuador.

The male genitalia are somewhat similar to those of *Nielsonia,* n. gen., but the pygofer differs from most *Nielsonia,* and the orange color of *Macunolla* will serve to distinguish it from *Nielsonia.*

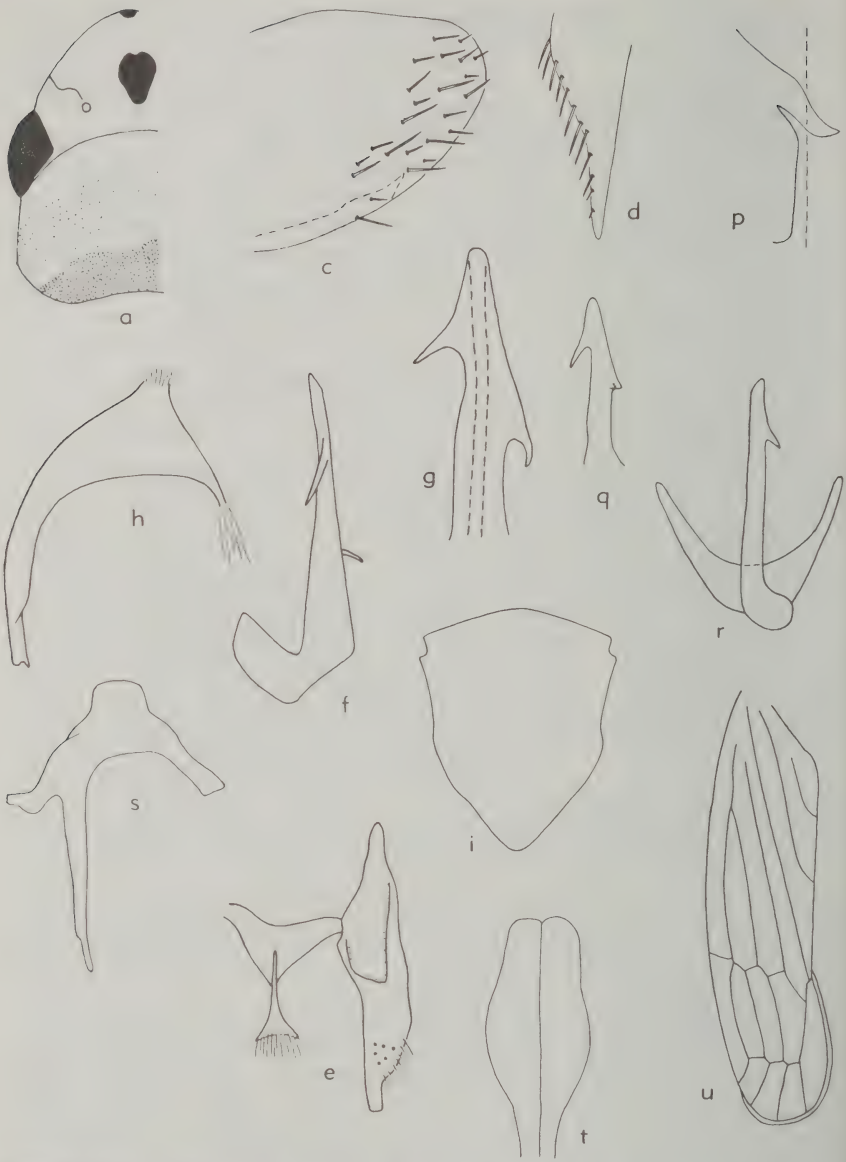


FIGURE 647.—*Macunolla ventralis* (Signoret) (*a*, *i*, from lectotype; *f*, *g*, from Turrialba, Costa Rica; *e*, *h*, from Tegucigalpa, Honduras; *c*, *d*, *p*, *q*, from Río Negro, Colombia; *r*, *s*, from El Valle, Panama; *t* from Morales, Guatemala; *u* from San Isidro del General, Costa Rica; plate not shown in *c*; *h* from dorsal view): *p*, Male pygofer apex, right side, from ventral view; *q*, aedeagal apex from ventral view; *r*, aedeagus from caudoventral view; *s*, paraphysis from anterodorsal view; *t*, bases of first valvulae from ventral view; *u*, forewing.

The present interpretation of *Tettigonia ventralis* Signoret males is based on the illustration of the female lectotype with which males were associated. The present interpretation of *T. miniaticeps* (Fowler) is based on a dissection of the lectotype by Dr. W. J. Knight of the British Museum and a comparison with the illustration of *M. ventralis* (Signoret) published here.

SPECIES OF *MACUNOLLA*

intorta, n. sp. Cent. and S. Mex., Guatemala, El Salvador.
ventralis (Signoret), 1854a:21 (*Tettigonia*). S. Mex., Br. Honduras, and Guatemala to Colombia and Ecuador. New combination.
miniaticeps (Fowler), 1900d:285 (*Tettigonia*). New synonymy.

KEY TO SPECIES OF *MACUNOLLA*

Males with aedeagal shaft median in location, females with bases of valvulae I not broadly expanded in ventral view and with apex of abdominal sternum VII more rounded; discal spot on crown with anterior margin concave and not touching apical spot ..... *ventralis* (Signoret) (fig. 647)

Males with aedeagal shaft not lying in median plane, females with bases of valvulae I broadly expanded in ventral view and with apex of abdominal sternum VII angular; discal spot on crown with anterior margin not concave, usually contiguous with apical spot ..... *intorta*, n. sp.

Macunolla intorta, NEW SPECIES

FIGURE 648

Length of male 6.0-6.2 mm., of female 6.2-6.5 mm. External structural characters as in generic description. Male with paraphyses asymmetrical and closely associated with aedeagal base, aedeagal shaft not lying in median sagittal plane, slender, elongate, curved, crossing median line, without processes. Female abdominal sternum VII longer than in *M. ventralis* (Signoret) and bluntly angulate at apex; bases of first valvulae greatly expanded in ventral view. Color of head, pronotum, and scutellum, orange, with a single median apical spot on crown, or two apical spots which are close together or contiguous, black; pronotum with a dark purple band on hind margin and often with an indistinct green area bordering it anteriorly and extending to middle of disk; forewings translucent purple; face and venter orange to yellow.

Holotype male, Finca Vergel, Chiapas, Mexico, May 13, 1935, M. F. 4152 (A. Dampf), additional specimens of both sexes, Vergel, Chiapas, May 11, 13, and 30, a number of dates in June, July 2; specimens from other localities in Chiapas, June; one specimen Chiapas, Nov. 19; one specimen, San Luis Potosí, Mexico (without dates); a series of specimens, Yepocapa, Guatemala, June; Santa Lucía, Guatemala, February; Los Amates, Guatemala, February; Hayon, Chiquito, Guatemala, March (all in D. M. DeLong collection). Other specimens, Quezltepeque, El Salvador, 500 M., July (CAS). San José,

Guatemala, June (MMB). Acajutla, El Salvador, July; and Cerro Rodondo, Guatemala, between November and March (ZIMH).

Macunolla intorta, n. sp., is closely related to *M. ventralis* (Signoret). It can be separated externally from the latter in the close-spacing of the spots on the crown (when they are separate) in *intorta,* in contrast to the more widely spaced spots in *ventralis*. The broad bases of the first valvulae of the female and the more acute abdominal sternum VII of *intorta* will separate it from

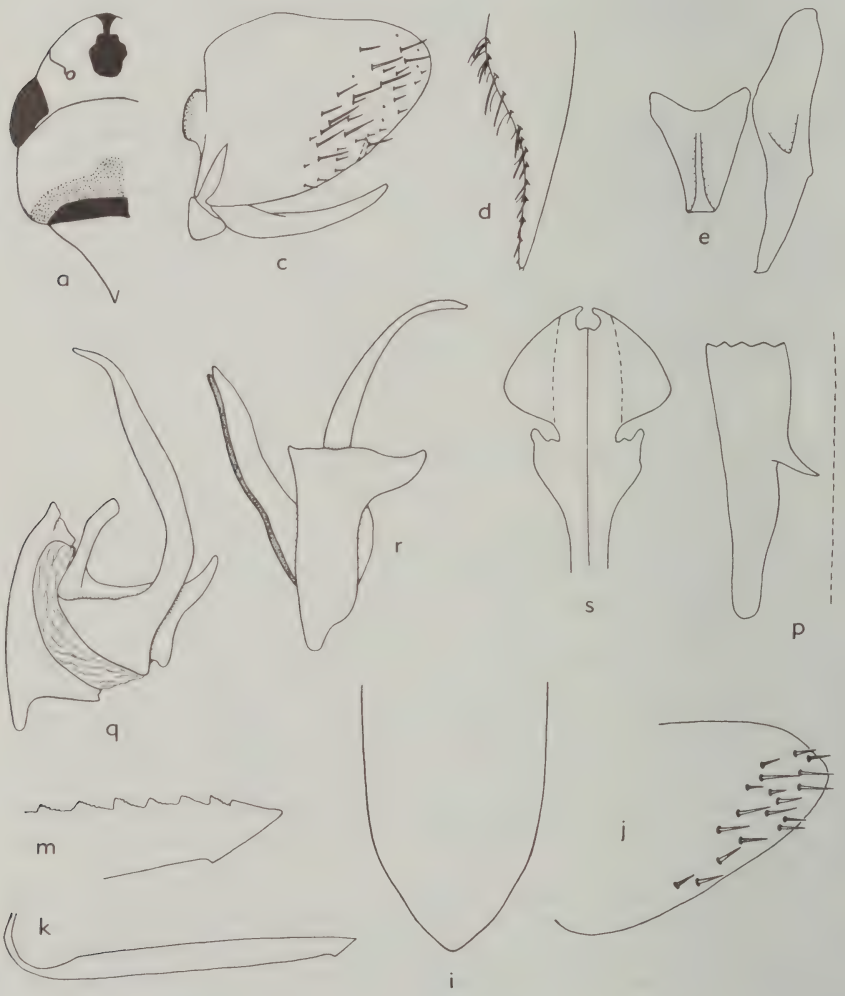


FIGURE 648.—*Macunolla intorta,* n. sp. (from specimens from Yepocapa, Guatemala): *p,* Male pygofer apex, right side, from ventral view; *q,* aedeagus and paraphyses, from ventral view; *r,* the same from lateral view; *s,* bases of first valvulae from ventral view.

females of *ventralis,* in which the bases of the first valvulae are slender. The form of the aedeagus of the male will separate *intorta* form *ventralis,* in which the aedeagal shaft is median.

110. KAPATEIRA, NEW GENUS

FIGURES 649-653

Type-species: *Oncometopia rosipennis* Osborn (1926b:172).

Length of male 7.5-10.6 mm.

Head moderately produced, median length of crown varying from six-tenths to seven-tenths interocular width and from slightly less than four-tenths to one-half transocular width, crown with or without a concavity across ocelli, surface without sculpturing or setae, other head characters as in *Nielsonia,* new genus (page 794).

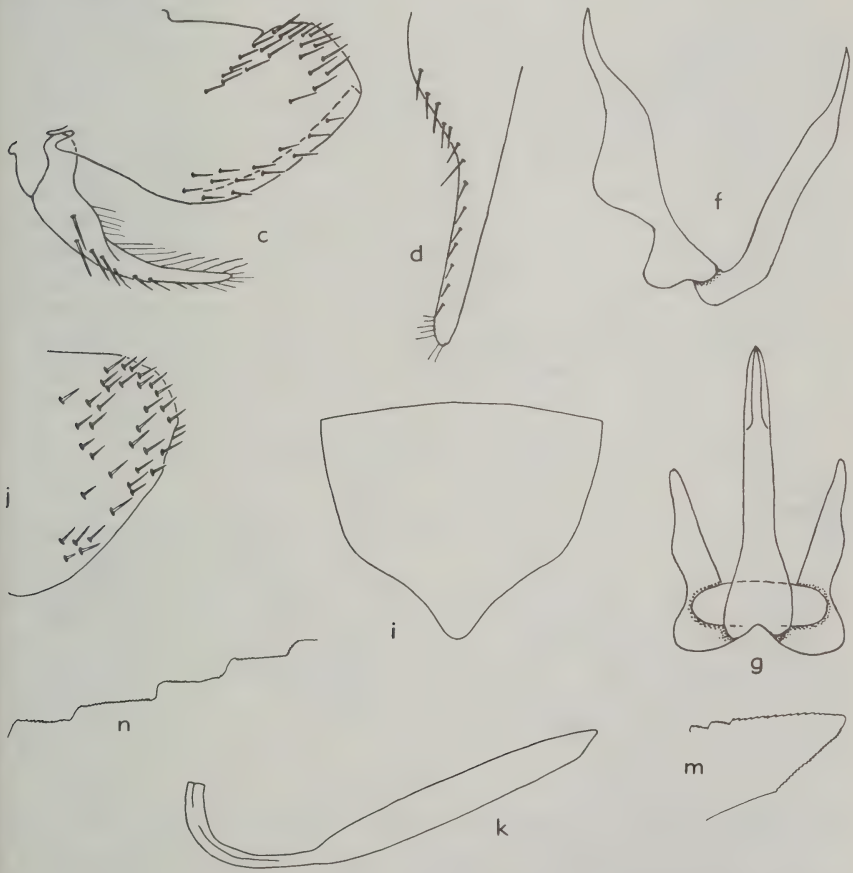
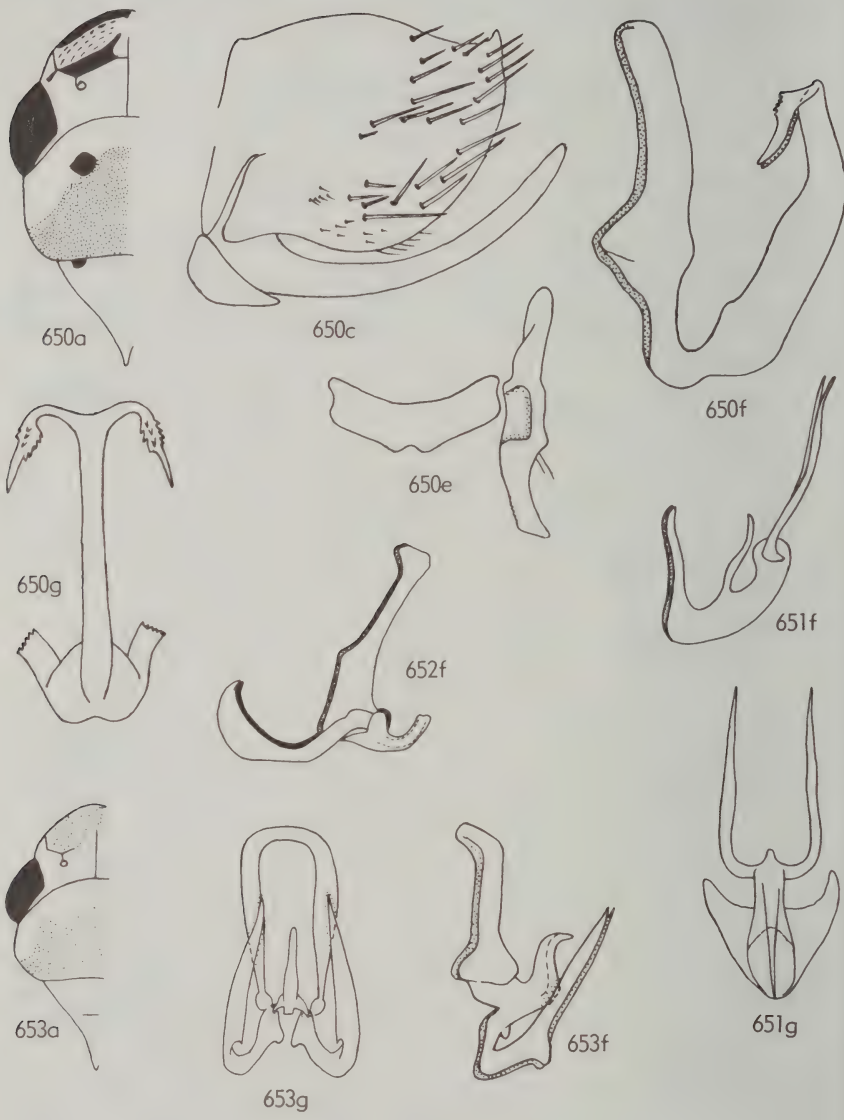


FIGURE 649.—*Kapateira rosipennis* (Osborn) (*i-k, m, n,* from specimen from Bogotá, Colombia; remainder from holotype).



FIGURES 650-653.—650, *Kapateira* sp. (from specimen from Panama Canal Zone). 651, *Kapateira* sp. (from specimen from Ecuador). 652, *Kapateira* sp. (from specimen from Colombia). 653, *Kapateira* sp. (from specimen from Barineta, Colombia).

Thorax as in *Nielsonia*. Forewing with membrane including all or almost all of apical cells, extending proximally along costal margin or not, with three closed anteapical cells, of which the bases of the outer two are proximal to the claval apex and the innermost variable in that respect, outermost anteapical cell petiolate, middle anteapical cell the longest, texture coriaceous with or without weak transverse rugae. Hindleg as in *Nielsonia*.

Male genitalia: Pygofer moderately produced, posterior margin varying from regularly convex to slightly produced posterodorsally and slightly angular, with numerous macrosetae on posterior half of disk, occasionally with interspersed microsetae, pygofer processes absent. Plates as in *Nielsonia*, but variable in their posterior extent compared with apex of pygofer. Style as in *Nielsonia*. Connective occurring as a transverse bar, or short Y-shaped (*K. rosipennis* (Osborn)). Aedeagus symmetrical, usually with paired processes (not very distinct in *rosipennis*) occurring basally or at apex of shaft, with or without additional processes. Paraphyses usually absent.

Female unknown.

Species of *Kapateira*, have the head, anterior portion of the pronotum and the scutellum dull yellow, with the disk of the pronotum and the forewing tan to purplish. Some of the species have black pronotal spots like those found in *Nielsonia*, and the size and facies of the species of *Kapateira* are close to *Nielsonia*. There are apparently four species of *Kapateira* at hand, and I have seen one additional one, but in the four species there is a total of only seven specimens. It seems advisable not to describe new species at this time, but I have illustrated the genitalia to show the variation within the genus. The only nominal species included is the type-species. The species are from Panama, Colombia, Venezuela, Ecuador, and Bolivia.

Kapateira is closely related to *Nielsonia* and to *Hortensia* Metcalf and Bruner, in the discussions of which distinguishing characters are treated.

111. Genus **HORTENSIA** Metcalf and Bruner

Figures 654-656

Hortensia Metcalf and Bruner, 1936a:928. Type-species: *Tettigonia similis* Walker, by original designation.

Length of male 4.0-6.3 mm, of female 4.7-7.7 mm.

Head moderately produced, median length of crown varying from approximately one-half to eight-tenths interocular width, and from slightly less than three-tenths to one-half transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before or (usually) on a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line, crown convex and without a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical or slightly oblique, often slightly concave; clypeus convex, muscle impressions usually distinct, transclypeal suture entire or obsolete at middle, clypellus not strongly produced, its contour continuing profile of clypeus.

Thorax with pronotal width equal to or less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk obscurely transversely rugulose in some specimens, not pubescent; scutellum not striate behind transverse sulcus. Forewing with membrane including all of apical cells, veins indistinct, with three closed anteapical cells, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly, narrowed apically to dorsoapical margin which is narrowly rounded to acute, with few macrosetae occurring in anteapical group. Plates triangular, extending posteriorly as far as pygofer apex, with uniseriate macrosetae. Style extending posteriorly as far as, or farther than apex of connective, obliquely truncate apically, with preapical lobe. Connective Y-shaped with arms widely divergent. Aedeagus simple, short, without processes. Paraphyses absent.

Female abdominal sternum VII with median portion of posterior margin slightly produced and slightly emarginate. Genital chamber without sclerites. Ovipositor with second valvulae each broadly expanded beyond basal curvature and with large dorsal quadrate teeth not extending quite to narrowly convex apex, with minute secondaries on the primary teeth and with anteapical denticulations on posterodorsal and posteroventral margins. Pygofer with sparse macrosetae on posterior half.

Species of *Hortensia* are dull yellow anteriorly, with the disk of the scutellum darker, and the head and anterior submarginal area of the scutellum marked with black. The black markings coalesce to some extent, and it is possible to sort segregates on the basis of color. I have been unable to find structural characters to support the color differences, to date, except in the case of the new species described below. There are minor intraspecific differences, also, in the shape of the aedeagus.

Hortensia similis (Walker) is the commonest species of Cicadellini in the New World and one of the most widespread. Specimens have been examined from southern U. S. A., numerous localities in Mexico, Central America, the West Indies, and all of the countries of South America except Uruguay and Chile. This range is the same for the genus. The genus is similar in many respects to *Kapateira*, new genus, and the latter may eventually be reduced to synonymy under *Hortensia*, especially if females of *Kapateira*, presently unknown, support such an action. *Hortensia* species are smaller than *Kapateira* (6.3 mm at most vs. 7.5 mm at least), have a more strongly produced male pygofer and with its setae more restricted, have the connective in the form of a Y instead of a transverse bar or very short Y, and have the aedeagus very short compared to the longer aedeagus (usually) of *Kapateira*.

Host plant records of *H. similis* (Walker), although numerous, do not show whether the specimens were feeding or not. These records include, from Colombia: corn (Antioquia: Bello and Medellín; Valle: Palmira; Meta:

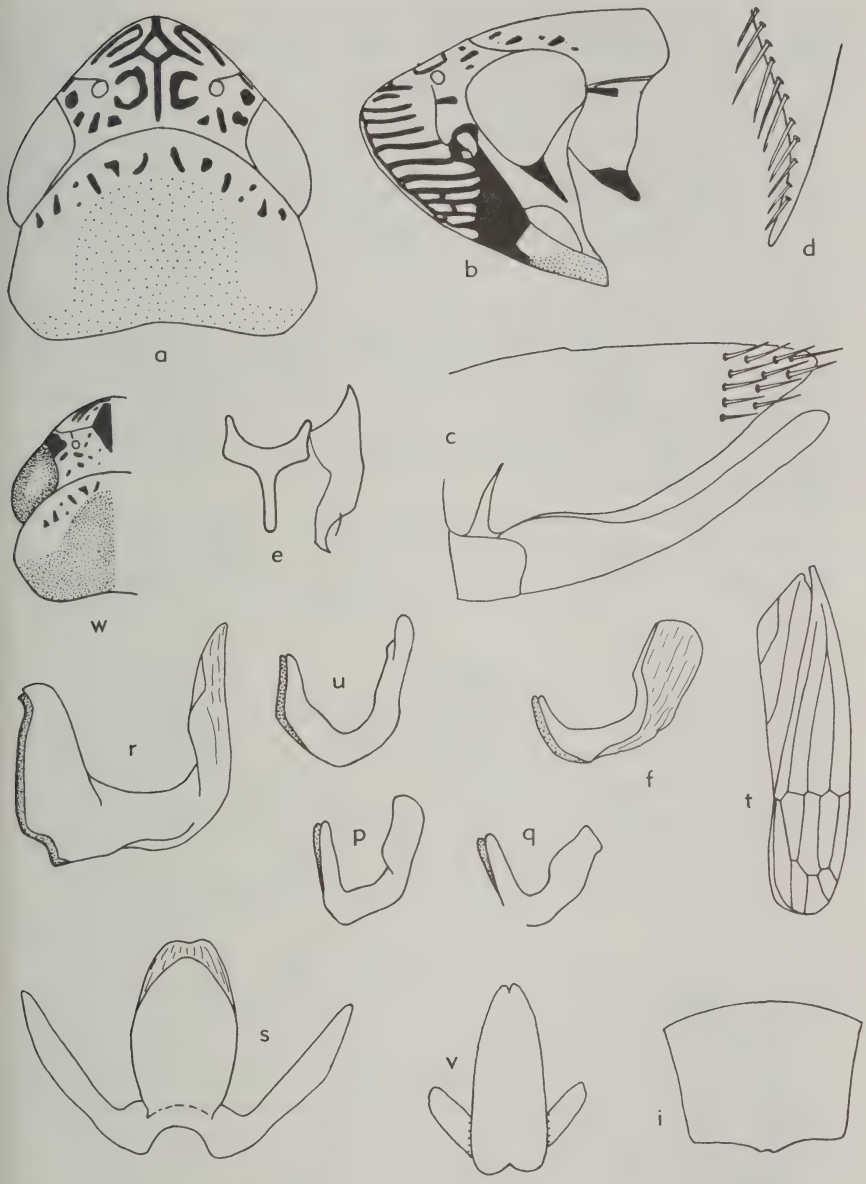


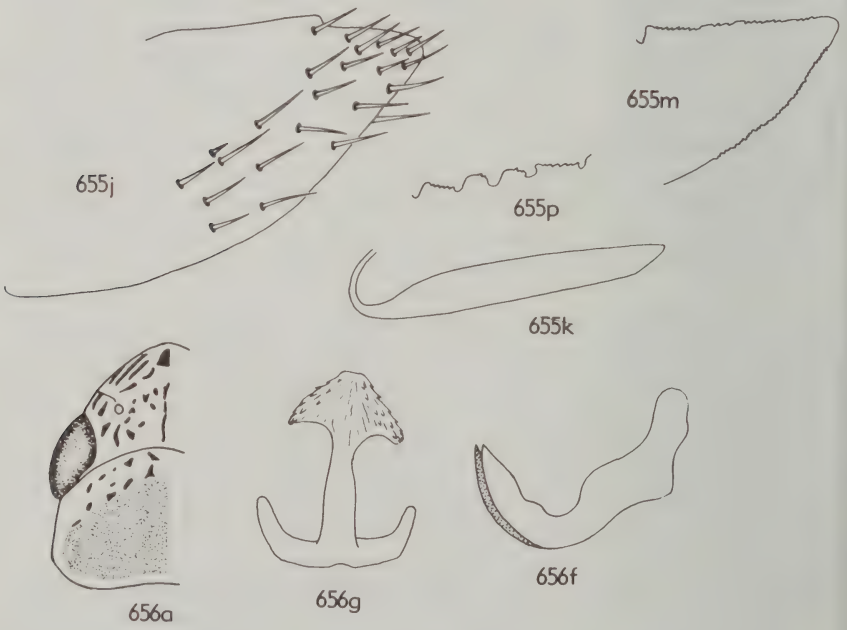
FIGURE 654.—*Hortensia similis* (Walker) (see also fig. 655) (*a, b, d,* from specimen from Hueyapan, Mexico; *c, r, s,* from Mato Grosso, Brazil; *e, q,* from Mona Island; *f* from El Valle, Panama; *i* from Alvarado, Mexico; *p* from 12 miles North of Santiago, Cuba; *t* from French Guiana; *u, v, w,* from Colombia): *p-r, u,* Aedeagus from lateral view; *s, v,* same from caudoventral view; *t,* forewing; *w,* anterior dorsum.

Peralonso, Acacias, Guichira, Puerto Lopez); sorghum (Tolima: Armero); grasses (Antioquia: Bello; Tolima: Armero; Valle: Palmira; Cauca: Popayan); "pastos indica" (Antioquia: San Geronimo); "cana" (Valle: Palmira); alfalfa (Antioqia: Bello); *Dolichos* sp. (Antioquia: Bello); beans (Antioquia: Bello; Valle: Palmira); *Crotalaria* (Antioquia: Medellín; Tolima: Armero); cow peas (Tolima: Armero); "Leguminosae" (Antioquia: Bello); *Canavalia* (Valle: Palmira); *Bidens* sp. (Tolima: Armero; Meta); *Citrus* sp. (Antioquia: Bello); "yucca" (Antioquia: Bello); strawberries (Narino: La Florida). The above were collected by Robert F. Ruppel and his associates in the Rockefeller station in Medellin.

In Peru, Juan Salazar, Juan Gonzalez and others, and the writer, collected *similis* on alfalfa in Lambayeque and Sullana; on *Paspalum* sp. in Abancay and Sullana; and on *Pennisetum* sp. in Abancay. In Puerto Rico, Osborn (1929b: 92) reported it abundant on *Panicum barbinode* Trinius, "malojillo" grass.

Cicadella cuneatula Osborn is placed in synonymy in the list below as a result of a study of the type-series; *Tettigonia prolixa* Lethierry, on the basis of an examination of the lectotype.

The holotype of *Tettigonia innotata* Walker is without head, left forewing, or abdomen. The species has been placed in *Draeculacephala* Ball by some authors, but the forewing does not have a plexus of veins. It is approximately



FIGURES 655, 656.—655, *Hortensia similis* (Walker) (see also fig. 654) (from specimen from Iquitos, Peru): *p*, Teeth beyond midlength of second valvula. 656, *H. dilatata*, n. sp., holotype.

the right size for *Hortensia,* and I compared the wing with Oman's (1949a; plate 32, fig. 7) illustration. It agreed fairly well, including the extent of the membrane. I place it in *Hortensia* provisionally.

SPECIES OF *HORTENSIA*

dilatata, n. sp. Panama, Fr. Guiana.
innotata (Walker), 1851b:770 *(Tettigonia).* Brazil. New combination.
similis (Walker), 1851b:769 *(Tettigonia).*
prolixa (Lethierry), 1881b:18 *(Tettigonia) (fide* Kramer, in litt.).
cuneatula (Osborn), 1926b:205 *(Cicadella).* New synonymy.

KEY TO MALES OF *HORTENSIA*

(H. innotata (Walker) not included)

Aedeagus in caudal view with shaft not abruptly broadened apically
similis (Walker) (figs. 654, 655)
Aedeagus in caudal view with shaft abruptly broadened apically
dilatata, n. sp.

Hortensia dilatata, NEW SPECIES

FIGURE 656, PAGE 810

Length 6.0-6.2 mm. Head in lateral view with anterior margins of antennal ledges vertical; face with muscle impressions distinct. Thorax with pronotal width less than transocular width of head, lateral margins parallel. Other external structural characters as in generic description. Male with style extending posteriorly farther than apex of connective; aedeagus in caudal view with apex membranous and bearing a number of denticulate ornaments, the whole apical one-third abruptly broader than shaft; other male genital characters as in generic description. Female abdominal sternum VII as in *H. similis* (Walker) (fig. 654*i*).

Ground color of crown, pronotum, and scutellum olive-yellow except pronotal disk which is dull green; head and anterior submarginal area of pronotum with dark markings that are weak and disjunct except a median postapical black marking which is more pronounced; face yellow with a mediobasal spot, and arcuate markings on muscle impressions, black; forewings green except membrane; venter and legs, yellow.

Holotype male and one female, La Forestière, French Guiana, upper Maroni River; and one specimen, lower Maroni River, July (NCS). Holotype on indefinite loan to USNM.

H. dilatata, n. sp., can be separated with certainty from *H. similis* (Walker), only by the shape of the aedeagus, which is never abruptly broadened apically in the Walker species. In addition to the type-series, I have seen a male (not presently at hand) from Tocumen Province, Panama. The species appears to be rare.

112. SCHISTOGONALIA, NEW GENUS

FIGURES 657, 658

Type-species: *Schistogonalia prava,* n. sp.

Length 8.0-9.9 mm.

Head weakly produced with anterior margin broadly rounded in dorsal view, median length of crown from four-tenths to slightly less than six-tenths interocular width, and from slightly less than three-tenths to slightly more than one-third transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle, disk with a shallow transverse concavity across ocelli, surface of crown weakly punctate, lateral clypeal sutures extending onto crown and almost attaining ocelli; antennal ledges not protuberant, in lateral view with their anterior margins oblique and convex; clypeus slightly flattened medially, muscle impressions distinct or not, clypellus with contour of its lower portion slightly more nearly horizontal than profile of remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin shallowly concave, disk weakly transversely rugulose, posterior margin concave; scutellum transversely rugose or not behind transverse sulcus. Forewing without a membrane, veins obscure. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, apex variable interspecifically, macrosetae varying interspecifically from few to many, located on posterior half of disk, pygofer with or without processes. Plates slender, triangular, narrowly rounded apically, extending posteriorly as far as pygofer apex, each with a row of macrosetae. Style not extending posteriorly beyond apex of connective, narrow and truncate apically, without a preapical lobe. Connective Y-shaped; aedeagus with shaft curved dorsally through 90°, with a single unilateral paraphysis closely associated with it at its base, more uniformly curved than shaft, and almost attaining apex of shaft.

Female (unknown for *S. rhypha,* n. sp.) abdominal sternum VII moderately produced, posterior margin tapered abruptly and obtusangular at apex (not illustrated, much as in *Borogonalia impressifrons* (Signoret), figs. 851*i, p,* but blunter and without posterolateral concavities). Ovipositor with second valvulae (fig. 657*k, m, p*) much as in *impressifrons* but with primary teeth abruptly more closely set at apex. Pygofer as in *impressifrons* but with apex more narrowly rounded.

Schistogonalia, new genus, occurs in Costa Rica and Panama. In spite of the similarity of the females to *Borogonalia,* new genus, it is probably more nearly related to *Nielsonia,* new genus, than to *Borogonalia.*

One specimen of *S. prava,* n. sp., was collected on *Phoebe tonduzii* Mez.

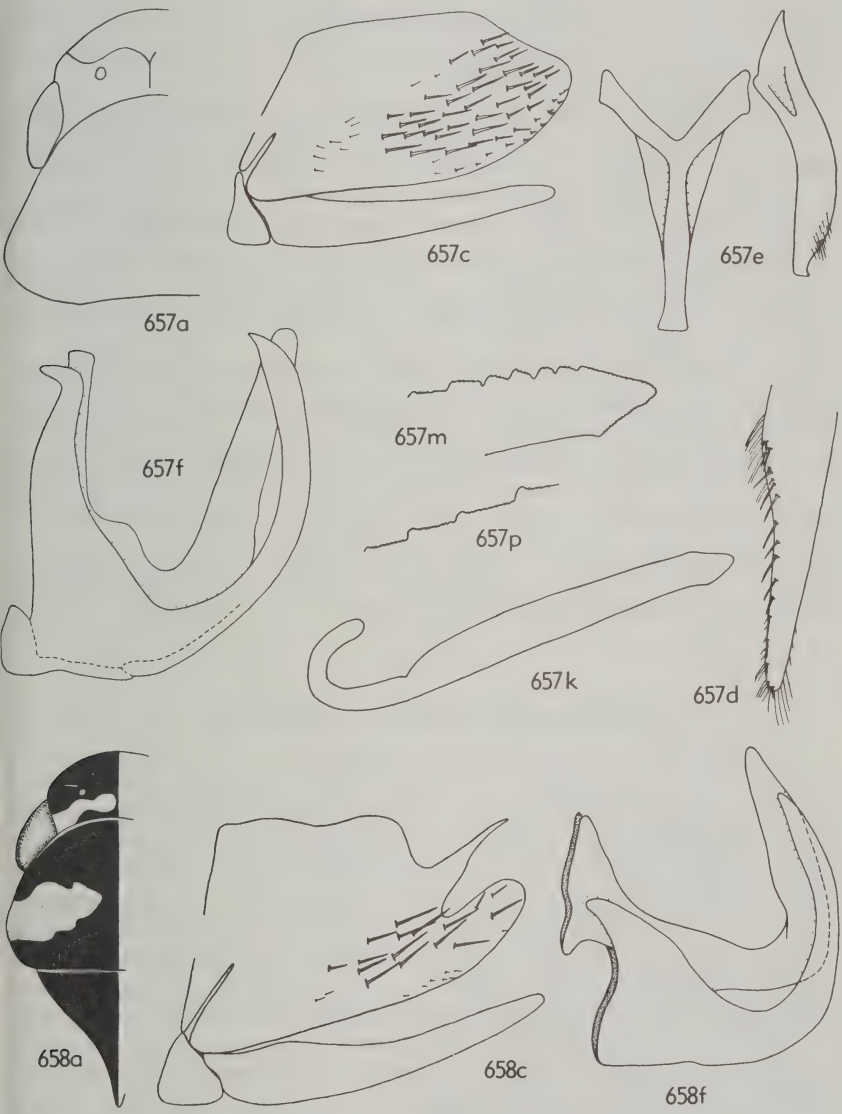
SPECIES OF *SCHISTOGONALIA*

prava, n. sp. Costa Rica.
rhypha, n. sp. Panama.

KEY TO SPECIES OF *SCHISTOGONALIA*

Ground color of dorsum including forewings, tan or castaneous; male pygofer without a process ..... *prava*, n. sp., page 814

Ground color of dorsum including forewings, black; male pygofer with a process ..... *rhypha*, n. sp., page 814



FIGURES 657, 658.—657, *Schistogonalia prava*, n. sp. (*k*, *m*, *p*, from specimen from Poás Volcano, Costa Rica; remainder from holotype): *p*, Basalmost teeth of second valvula. 658, *S. rhypha*, n. sp., holotype.

Schistogonalia prava, NEW SPECIES

FIGURE 657, PAGE 813

Length of male 9.6 mm, of female 9.5-9.9 mm. Head with median length of crown varying from slightly less than one-half to slightly less than six-tenths interocular width, and from three-tenths to more than one-third transocular width; scutellum not or only very weakly rugulose behind transverse sulcus. Male with pygofer tapered and narrowly rounded at apex, macrosetae numerous, pygofer processes absent.

Crown, pronotum, scutellum, and forewings, tan (castaneous in one specimen and with pronotum bearing dull white spots on posterior half), forewings each with yellow to ivory spots, one near base of clavus and one near its middle and with an adjacent spot on corium posterolaterally from each of these, the more anterior pair of spots varying in size and shape, the more posterior ones almost continuous across the claval suture, with or without an additional spot on corium opposite claval apex; face, propleura, and legs concolorous with dorsum except black apex of each anterior tibia, and darkly suffused anterior and middle tarsi.

Holotype male, Irazú, Costa Rica (Schild and Burgdorf); two males, two females and one specimen without abdomen, Costa Rica, "No. 1110" (C. H. Ballou); one female, Poás Volcano, Costa Rica, 2300 m., April 30, 1933 "C. R. #1110" (S. and C. H. Ballou); one female, "Coliblanco", Costa Rica, January 1937, on *Phoebe tonduzii* (C. H. Ballou), "Costa Rica No. 1110"; one female, "La Chonta", Costa Rica, June 9, 1951 (O. L. Cartwright) (USNM). One female, Pacayas, Costa Rica (C. Werckele) (AMNH).

S. prava, n. sp., has no pygofer processes in the male, and is smaller, darker, and differently marked than *S. rhypha*, n. sp.

Schistogonalia rhypha, NEW SPECIES

FIGURE 658, PAGE 813

Length of male 8.0-8.3 mm, female unknown. Head with median length of crown approximately four-tenths interocular width and less than three-tenths transocular width, scutellum weakly rugulose behind transverse sulcus. Male pygofer bearing a dorsoapical acute process and with a narrowly rounded posteroventral lobe, macrosetae few compared with *S. prava*, n. sp.

Crown, pronotum, scutellum, and forewings, black, with an interrupted ivory band across base of crown and an interrupted bluish-white band across pronotum; forewing with pale bluish spots in the same pattern as in *prava* and with apical spot more pronounced, apical portion of wing suffused with dark red; clypeus and median portion of clypellus black, remainder pale with variable degree of dark suffusion; propleura dark except narrow red ventral margin of proepisternum and broad ivory band parallel to posterior margin of proepimeron; remainder of pleura and all femora red, tibiae and tarsi tan.

Holotype and one additional male, Volcán, Chiriquí, Panama, 6,000 ft., June 1939 (J. R. Slevin) (USNM).

S. rhypha, n. sp., may be distinguished readily from *S. prava* by the male pygofer processes and the darker color.

113. BUBACUA, NEW GENUS

FIGURE 659

Type-species: *Hortensia filicis* Metcalf and Bruner (1936a:928).

Length of male 5.5-5.9 mm, of female 6.3 mm.

Head moderately produced, median length of crown varying from one-half to seven-tenths interocular width, and from slightly less than one-third to four-tenths transocular width, anterior margin obtusely subangulate in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle, crown convex and without a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and rectilinear, ledges not carinate dorsally; clypeus flattened, muscle impressions not distinct, transclypeal suture entire or obsolete at middle, clypellus not strongly produced, its contour continuing profile of clypeus.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae usually incomplete, posterior margin concave, disk without sculpturing or pubescence; scutellum not striate behind transverse sulcus. Forewing with membrane variable but including inner apical cell and not including basal portion of third apical cell nor any part of outer apical cell, veins not elevated, distinct, with three closed anteapical cells, with four apical cells of which the base of fourth is more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere equal to or greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced posteriorly, apical margin smoothly convex, with a number of elongate macrosetae on apical half. Plates triangular, extending posteriorly as far as pygofer apex, with uniseriate macrosetae. Style not extending posteriorly as far as apex of connective, narrowly rounded apically. Connective Y-shaped with arms widely divergent. Aedeagus simple, short, without processes. Paraphyses variably vestigial.

Female abdominal sternum VII with posterior margin produced posteriorly in approximately a right angle but slightly more acute at tip. Genital chamber without sclerites. Ovipositor with broad, toothed portion of each second valvula extending through most of length beyond basal curvature, teeth few, widely separated and with numerous denticles between teeth, with dorsal anteapical denticles; apex narrowly rounded.

Bubacua, new genus, is similar in many features to *Hortensia* Metcalf and Bruner, as these authors stated in the original description of the type-species. The venation of the forewing is like that of *Hortensia*. But vestigial paraphyses are present, the ocelli are closer to the median line than to the adjacent anterior eye angle, the clypeus is flattened, the width of the pronotum exceeds the transocular width of the crown; the male pygofer is not produced acutely, and all of these features differ from *Hortensia*. Also the distinct veins of the forewing and the partly (at least) pale crossveins differ from *Hortensia*. The female genital structures suggest a close relationship to *Cubrasa*, new genus.

Bubacua, new genus, is known only from the type-species, which occurs in Cuba. My interpretation of this species is based on a study of the type-series, including the holotype.

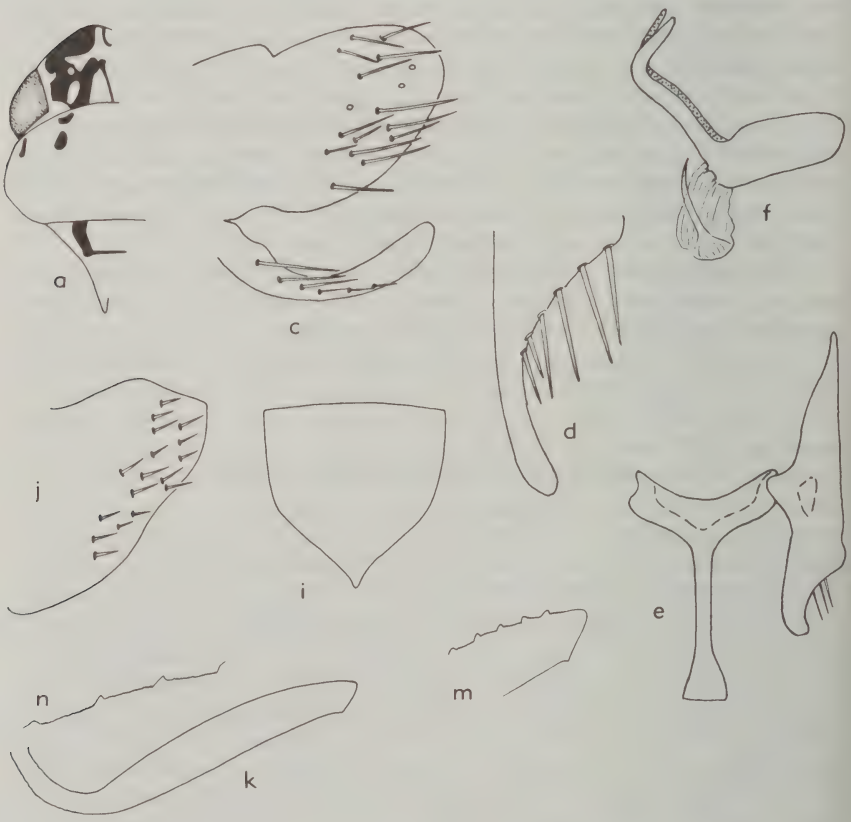


FIGURE 659.—*Bubacua filicis* (Metcalf and Bruner) (*c-f*, from paratype from Sierra Maestro, Cuba; remainder from holotype; vestigial paraphysis shown in *f*).

114. CUBRASA, NEW GENUS

FIGURE 660

Type-species: *Poeciloscarta cardini* Metcalf and Bruner.

Length 6.3-7.5 mm.

Head moderately produced, anterior margin slightly obtusely rounded in dorsal view, median length of crown varying from slightly less than eight-tenths to slightly less than nine-tenths interocular width, and from slightly less than four-tenths to slightly more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located slightly behind a line between anterior eye angles, each ocellus approximately equidistant from median line of crown and adjacent anterior eye angle, crown with a broad shallow median concavity in basal two-thirds, without sculpturing or setae; antennal ledges not protuberant, in lateral view with anterior margins vertical; lateral clypeal sutures extending onto crown and attaining ocelli; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side, clypeus flattened medially, muscle impressions distinct, transclypeal suture distinct, clypellus with contour of upper half continuing profile of clypeus, lower half almost parallel to long axis of body.

Thorax with pronotal width less than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete, posterior margin slightly concave, disk without sculpturing or pubescence; scutellum not transversely striate behind transverse sulcus. Forewing with membrane including most of inner apical cell and all but basal portions of remaining apical cells, with three closed anteapical cells, the base of the middle one more distal than either of the adjoining anteapical cells, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of proximal tarsomere equal to or greater than length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, with a slight concavity at apex, with very few (1-3) anteapical small macrosetae, pygofer processes absent. Plates slender, triangular, with divergent apices, each with a single row of small setae in apical two-thirds. Style extending approximately as far apically as apex of connective. Connective with stem longer than arms which are widely divergent. Aedeagus curved strongly dorsad, without processes, in lateral view not expanded in apical half, gonopore anteapical on anterior margin. Paraphyses symmetrical.

Female abdominal sternum VII moderately produced, with posterior margin acute apically. Genital chamber with dorsal wall heavily sclerotized, and with a pair of discal circular areoles. Ovipositor with second valvulae broad and toothed dorsally throughout most of length, teeth slanting posteroventrally and with minute intermediate secondaries between the primaries, with anteapical ventral denticles, valvular apices narrowly rounded. Pygofer with numerous macrosetae on apical half.

Cubrasa, new genus, is known only from the type-species, *C. cardini* (Metcalf and Bruner, 1936a:937) from Cuba, a species with crown, pronotum, and

scutellum, yellow with black markings, and with the forewings brick red with some veins dark. The genus is known only from Cuba. Superficially, *C. cardini* is similar to *Ehagua dubiosa* (Dozier), but numerous differences occur, e.g. no aedeagal processes in *cardini*, style apices not strongly truncate in *cardini;* forewings with bases of anteapical cells not on same transverse line in *cardini*.

I have studied the holotype of *Poeciloscarta cardini* Metcalf and Bruner.

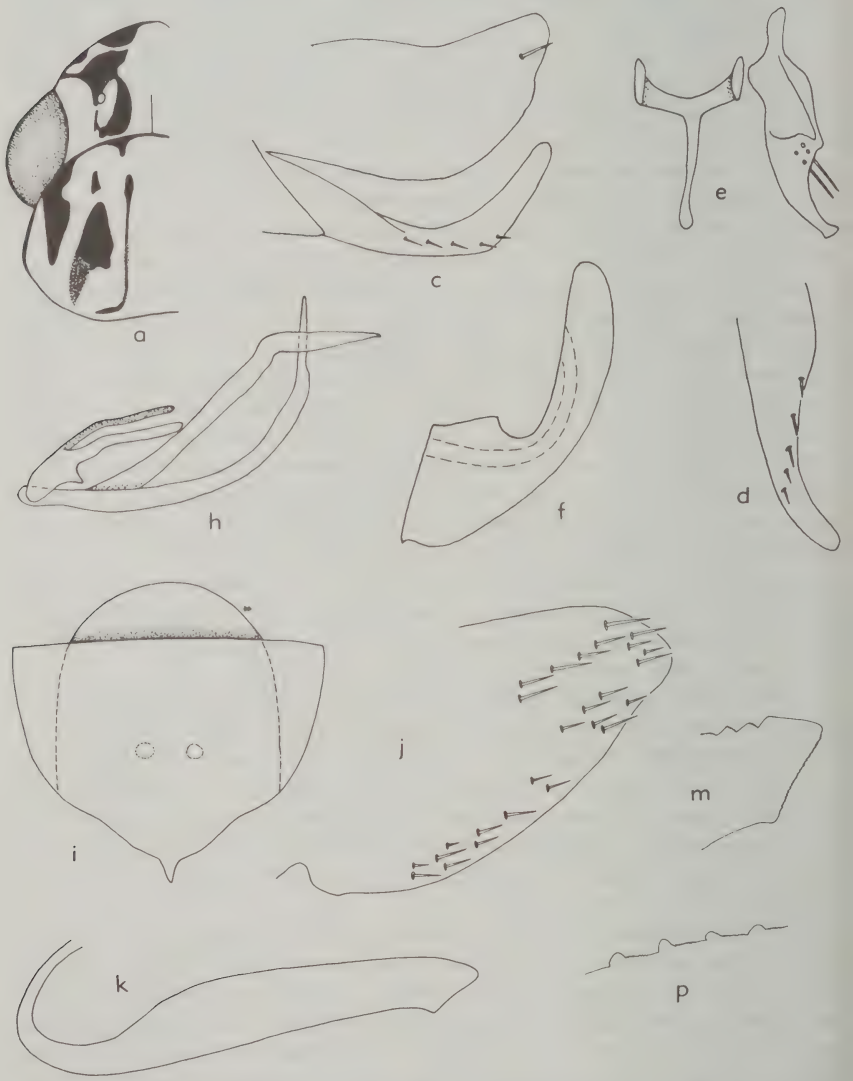


FIGURE 660.—*Cubrasa cardini* (Metcalf and Bruner) (*i-k*, *m*, *p*, from specimen from Cuba; remainder from Baracoa, Cuba; *h* from lateral view): *p*, Teeth near base of toothed area of second valvula.

115. ISOGONALIA, NEW GENUS

FIGURES 661-665

Type-species: *Tettigonia sexlineata* Signoret.

Length of male 4.4-4.7 mm, of female 5.0-5.5 mm.

Head moderately produced with anterior margin narrowly to broadly rounded in dorsal view, median length of crown varying from six-tenths to more than eight-tenths interocular width and from four-tenths to almost six-tenths transocular width, without a carina at transition from crown to face, ocelli located on or behind a line between anterior eye angles, variable in relation to relative distance from adjacent anterior eye angle and to median line, crown convex and with or without a transverse concavity, without a median

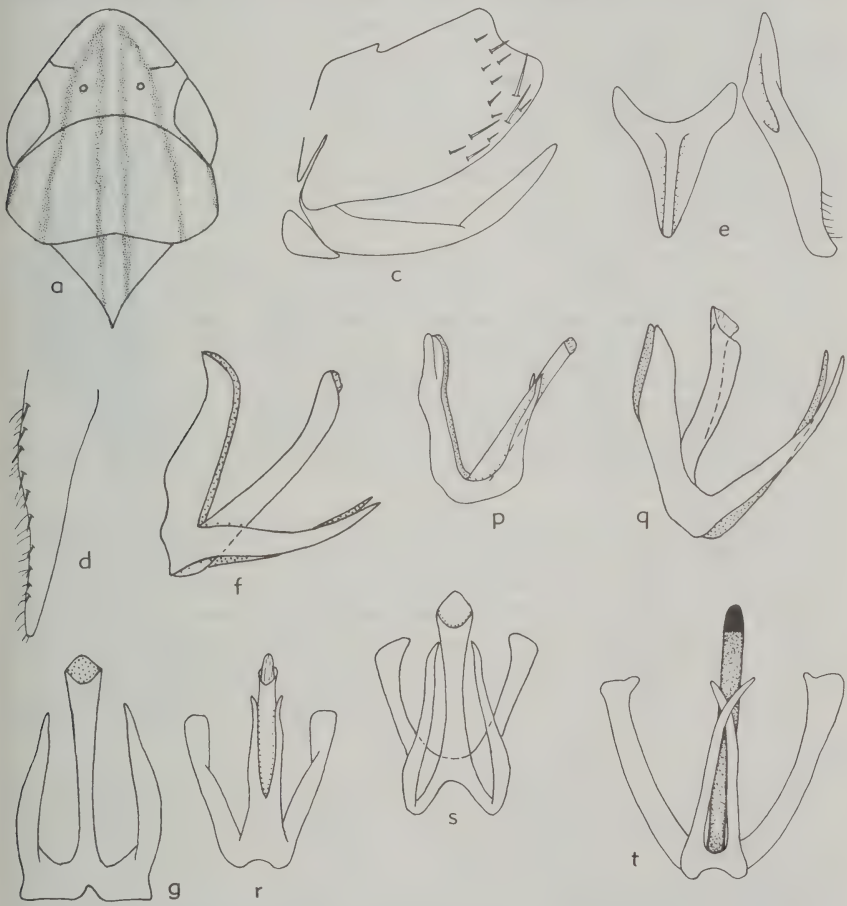


FIGURE 661.—*Isogonalia sexlineata* (Signoret) (see also fig. 662); (*p*, *r*, from Boqueta, Panama Canal Zone; *q*, *s*, from Nogales, Vera Cruz, Mexico; *t* from San Pedro de Montes de Oca, Costa Rica; remainder from El Salvador): *p*, *q*, Aedeagus from lateral view; *r-t*, same from caudoventral view.

fovea, with slight lenticular impressions, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical or slightly oblique, varying from convex to concave; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus convex, not flattened medially, median area granular, muscle impressions distinct or not, transclypeal suture obsolete at middle, clypellus not produced, its contour continuing profile of clypeus, or slightly more nearly horizontal.

Thorax with pronotal width equal to or slightly greater than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk transversely rugulose or not in its apical half, not pubescent; scutellum rarely weakly transversely striate posteriorly. Forewing with membrane indistinct or variable in extent, veins distinct or not, with three closed anteapical cells, the bases of which are more proximal than claval apex, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins (occasionally with few supernumerary crossveins in outer anteapical cell); forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere equal to or greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately to well produced with anteapical dorsal margin concave (exception: *I. labyrinthica*, n. sp.), with few macrosetae located on disk in apical half; pygofer processes absent. Plates narrowly triangular, extending as far posteriorly as pygofer apex or not, with small uniseriate macrosetae, occasionally with a few macrosetae out of line at apex of plate. Style extending posteriorly beyond apex of connective, convex apically or truncate (*I. praeterita* (Fowler)). Aedeagus with shaft slender, moderately long, with processes that are variable interspecifically. Paraphyses present or absent.

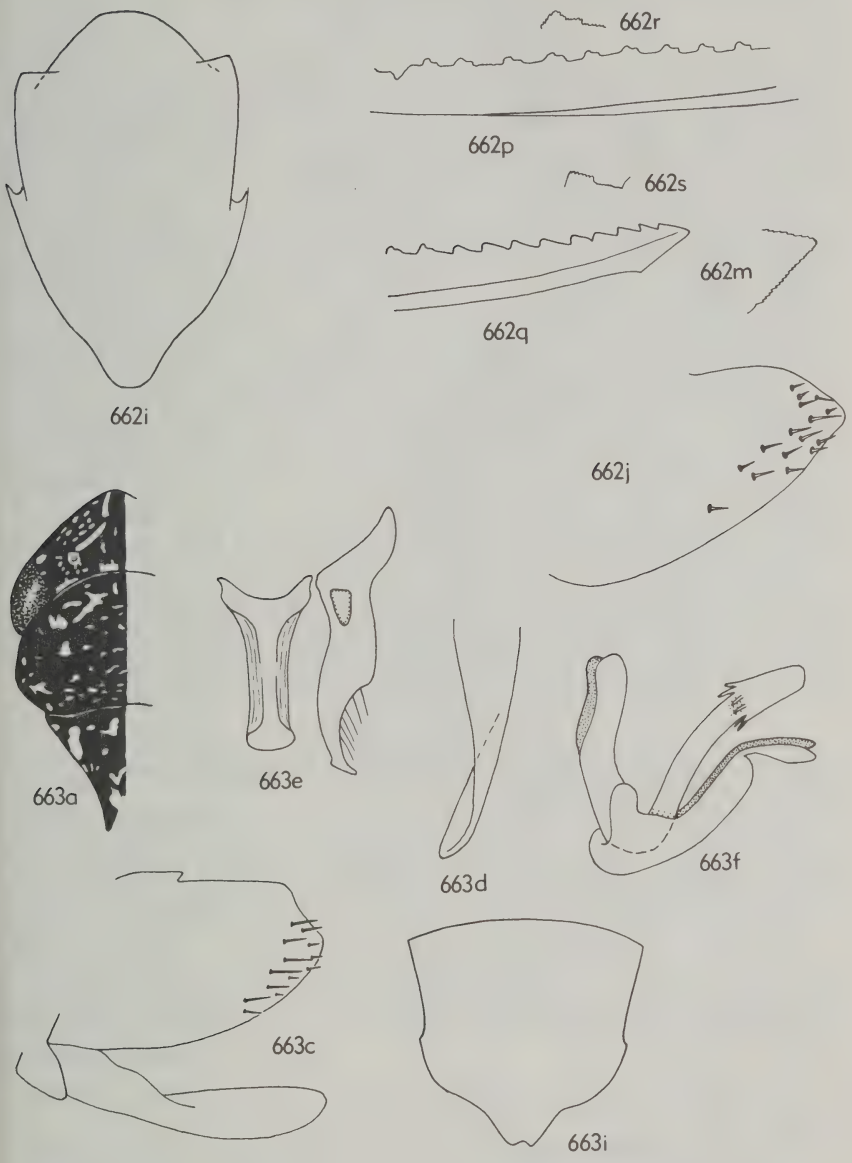
Female abdominal sternum VII, well produced posteriorly, with posterolateral margins oblique, the apex angular, concave, or narrowly rounded. Ovipositor with second valvula broadened beyond basal curvature, toothed on dorsal margin, the teeth widely spaced except near apex, and each with smaller secondary teeth, without or with very minute anteapical denticulations on posterodorsal and posteroventral margins, apex acutangular.

Isogonalia, new genus, ranges from central Mexico to Panama. I have also examined specimens (of *I. sexlineata* (Signoret)) from Peru and "Santarem", Brazil, but these were possibly mislabeled.

My identification of *Tettigonia praeterita* Fowler is based on illustrations of the female lectotype and male specimens agreeing with the illustrations.

My identification of *Tettigonia sexlineata* Signoret is based on an examination of the female lectotype.

Isogonalia, new genus, is in the *Graphocephala* generic group. It includes *Amphigonalia*, new genus, *Manzutus* Oman, *Campecha* Melichar, *Allogonia* Melichar, *Decua* Oman, *Graphocephala* Van Duzee, and *Plummerella* DeLong. All of these have lenticular impressions on the crown of the head behind the anterior marginal area except some species of the large and variable genus



FIGURES 662, 663.—662, *Isogonalia sexlineata* (Signoret) (see also fig. 661) (*j* from specimen from Jalapa, Mexico; remainder from El Salvador): *p*, Basal portion of second valvula; *q*, apical portion of same; *r*, tooth near base of same; *s*, tooth near apex of same. 663, *I. praeterita* (Fowler) (*a*, *i*, from lectotype; remainder from specimen from Nepantla, Mexico).

Graphocephala. The group is chiefly Central American, although there are a number of North American species, and *Graphocephala* has representatives in Colombia and French Guiana. There are also records of *Isogonalia* from Peru and Santarem, Brazil, as noted above. All have abdominal sternum VII of the female produced, and a similar chaetotaxy of the female pygofer. There is much similarity, also, in the second valvulae of the ovipositor, except in some species of *Graphocephala* and in *Manzutus* and *Plummerella* of which both of the last appear to have diverged in restricted habitats.

In some species in this complex, the hind knees do not reach the posterior proepimeral margins in repose, as discussed in part 1 of the present reclassification (Young, 1968a:16), a condition probably derived within the *Graphocephala* generic group.

The complex may be related to *Trichogonia* Breddin (cf. discussion above) as indicated by similarities in the females of *Graphocephala nigrifascia* (Walker) and *G. appropinquans* (Fowler) with species in the *Trichogonia* complex.

I. sexlineata (Signoret) was collected at the mouth of the river in the city of Vera Cruz, on *Pluchea odorata* Cassini, by N. L. H. Krauss, and in Fortín, Vera Cruz on *Eupatorium adenophorum* Sprengel by the same collector. A series of specimens was collected in Guatemala on *Cinchona* by N. L. H. Krauss. A series of specimens was also collected on *Geranium* in San Pedro de Montes de Oca, Costa Rica, by C. H. Ballou.

There is a great deal of variation in the markings of the anterior dorsum in *sexlineata*. In some specimens the black markings are narrower, or narrower and less complete than in fig. 661*a*. There is also variation in the degree to which the aedeagal processes are separate at their bases (figs. 661*r-t*).

SPECIES OF *ISOGONALIA*

conflicta, n. sp. Mexico: Vera Cruz, S. L. P.; British Honduras; Honduras

labyrinthica, n. sp. Mexico: Hidalgo.

praeterita (Fowler), 1899d:243 (*Tettigonia*). Mexico: Morelos, D. F., Guerrero. New combination.

sexlineata (Signoret), 1855d:792 (*Tettigonia*). S. Mexico, Guatemala, El Salvador, Costa Rica, Panama, Brazil (?), Peru (?). New combination.

KEY TO SPECIES OF *ISOGONALIA*

1. Crown, pronotum, and scutellum black with numerous pale markings; aedeagus with several small anteapical retrorse processes *praeterita* (Fowler) (fig. 663)

   Crown, pronotum, and scutellum green or greenish-yellow; aedeagus not as above 2

2. Crown with a median inverted anchor-shaped marking outlined in black; aedeagus with apical processes ..... *labyrinthica*, n. sp., page 823

   With neither of the above characters 3

3. Crown with paired anteapical black spots in addition to black lines *conflicta*, n. sp., page 823

   Crown with linear markings only ..... *sexlineata* (Signoret) (figs. 661, 662)

Isogonalia conflicta, NEW SPECIES

FIGURE 665, PAGE 824

Length of male 4.0 mm, of female 4.8-4.9 mm. Head with median length of crown varying from three-fourths to more than eight-tenths interocular width and from slightly less than one-half to six-tenths transocular width; ocelli located on a line between anterior eye angles and each closer to median line of crown than to adjacent anterior eye angle; clypeus with muscle impressions not distinct; forewing with membrane including inner apical cell and apical portions of remaining cells, veins distinct; hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male with pygofer subangulate at apex; plates extending posteriorly as far as pygofer apex; style with a lateral lobe near midlength of shank; aedeagal shaft not very broad, with a pair of short tapering processes arising near its base, extending almost parallel to shaft and slightly divergent from each other, not attaining shaft apex; paraphyses absent. Female genitalia as in generic description and very close to the illustration of *Amphigonalia severini* (DeLong) (fig. 670).

Ground color of crown, anterior portion of pronotum and all of scutellum greenish-yellow, with a dot at apex of crown, and a pair of oblique capitate markings on disk, black, often with two pairs of weak linear discal markings parallel to median line, black; scutellum often with two or four small weak black markings; posterior portion of pronotum and forewings deeper green, often with a blue vitta in brachial cell. Face, propleura and legs yellow, with a black spot below dorsopleural carina; male plates black apically.

Holotype and two additional males and one female, Vera Cruz, V. C., Mexico, July 1959 (N. L. H. Krauss); two females same locality, December 1959 (N. L. H. Krauss) on *Pluchea odorata* Cassini; six males and three females, Boca del Rio, V. C., Mexico, November, 1960 (N. L. H. Krauss); one male and one female, Tamazunchale, Mexico, August 13, 1936 (E. D. Ball); one female, Baking Pot, British Honduras, August, 1953 (N. L. H. Krauss); one female, El Cayu, British Honduras, 6298, September, 1959, 23507, on leaves of *P. odorata* (N. L. H. Krauss); one female, Tegucigalpa, Honduras, March 30, 1917 (F. J. Dyer) (all USNM).

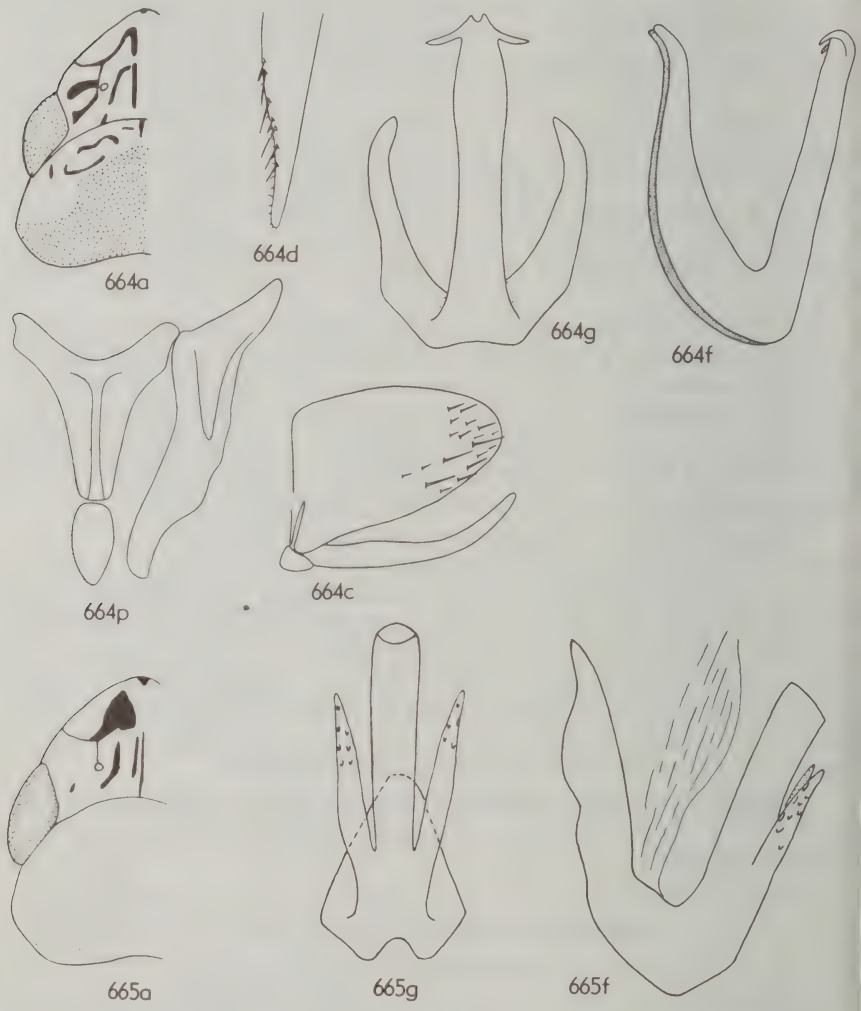
I. conflicta, n. sp., differs markedly from other species in the genus in the color pattern which will serve to separate it readily. The aedeagal processes are also distinctive.

Isogonalia labyrinthica, NEW SPECIES

FIGURE 664, PAGE 824

Length of male 6.3-6.5 mm, of female 7.2 mm. Head with median length of crown varying from two-thirds to three-fourths interocular width and from slightly more than four-tenths to slightly less than one-half transocular width; ocelli located on a line between anterior eye angles, each closer to median line of crown than to adjacent anterior eye angle; clypeus with muscle impressions not very distinct. Forewing with membrane including only inner portion

of inner apical cell, veins distinct; hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Male with pygofer convex at apex; plates extending posteriorly as far as pygofer apex; style without a lateral lobe; aedeagus with shaft elongate, with a pair of short divergent apical processes; paraphysis a small sclerite at apex of connective. Female genitalia as in generic description.



FIGURES 664, 665.—664, *Isogonalia labyrinthica*, n. sp., holotype: *p*, Style, connective, and paraphysis, from dorsal view. 665, *I. conflicta*, n. sp. (from specimen from Boca del Río, Vera Cruz, Mexico; part of anal tube shown in *f*).

Ground color of crown, anterior portion of pronotum, and scutellum, greenish-yellow; crown with a narrow inverted anchor-shaped marking outlined in black, a black spot at apex and variable black markings next to each eye; pronotum with irregular spots and vermiculations near anterior margin; scutellum with a few black markings before transverse sulcus; remainder of pronotum and forewings dark green with a narrow blue stripe in brachial cell bordering claval suture; face yellow with a few black dots; proepimeron yellowish-green with a black spot below dorsopleural carina; remaining pleural region yellowish in female, yellowish with black markings in male; legs yellow.

Holotype male, and one female, Jacala, Mexico, August 28, 1936 (E. D. Ball) "323k",; one male, same data as preceding except August 17, 1936, "233" (USNM).

I. labyrinthica, n. sp., is the only species in the genus with apical aedeagal processes.

116. AMPHIGONALIA, NEW GENUS

FIGURES 666-670

Type-species: *Tettigonia gothica* Signoret.

Length 4.0-5.9 mm.

Head moderately to strongly produced, with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than two-thirds to approximately eight-tenths interocular width, and from four-tenths to approximately one-half transocular width, without carina at transition from crown to face, ocelli located on or behind a line between anterior eye angles, each ocellus equidistant from median line of crown and adjacent anterior eye angle or slightly closer to latter, crown usually convex and usually without a distinct concavity across ocelli, without a median fovea, with numerous irregularly arranged lenticular impressions, setae absent, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical or oblique and either rectilinear or slightly convex; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus very slightly convex medially, median clypeal area granulate, muscle impressions usually distinct, transclypeal suture entire or not, clypellus not produced but with its contour continuing profile of clypeus.

Thorax with pronotal width approximately equal to transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk of pronotum transversely rugulose or not, not pubescent; scutellum not transversely striate behind transverse sulcus. Forewing with only inner apical cell membranous, veins not elevated, distinct or not, with three closed anteapical cells of which the bases are proximal to a transverse line across the claval apex, with or without supernumerary crossveins in anteapical cells, in some specimens forming a network of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or (rarely) 2:1:0; length

of first tarsomere equal to or greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, apex variable interspecifically from regularly convex to angulate, with a number of macrosetae of varied size on posterior half; pygofer process present, dorsal, and anteapical. Plates slender, triangular, extending posteriorly to or beyond pygofer apex,

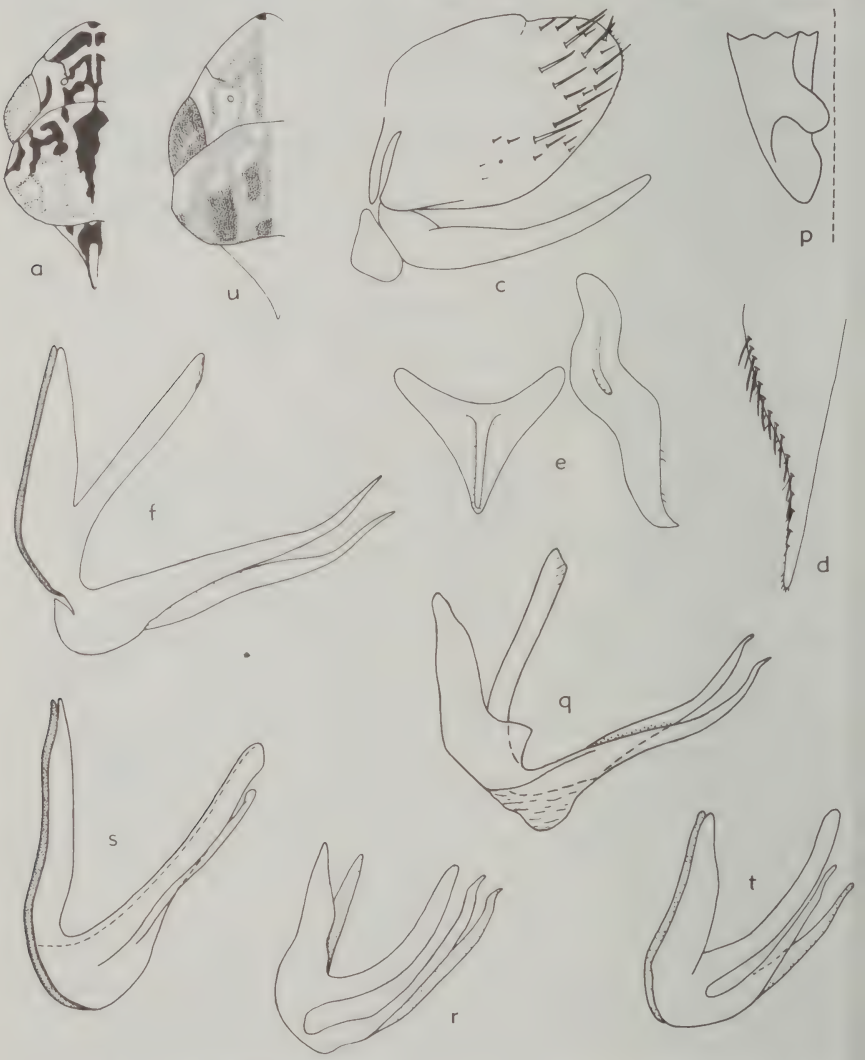


FIGURE 666.—*Amphigonalia aridella* (DeLong) (*q* from specimen from Huachuca Mountains, Arizona; *r* from Chiricahua Mountains, Arizona; *s* from Mexico; *t, u,* from Guadalajara, Mexico; remainder from Puebla, Mexico): *p,* Male pygofer apex, left side, from dorsal view; *q-t,* aedeagus from lateral view; *u,* anterior dorsum.

with numerous small setae arranged longitudinally. Style extending posteriorly as far as apex of connective or farther, truncate apically, with or without preapical lobe. Aedeagus symmetrical with shaft broad or very slender (varying specifically), usually with a pair of processes which vary interspecifically from long and slender to almost vestigial. Paraphyses absent.

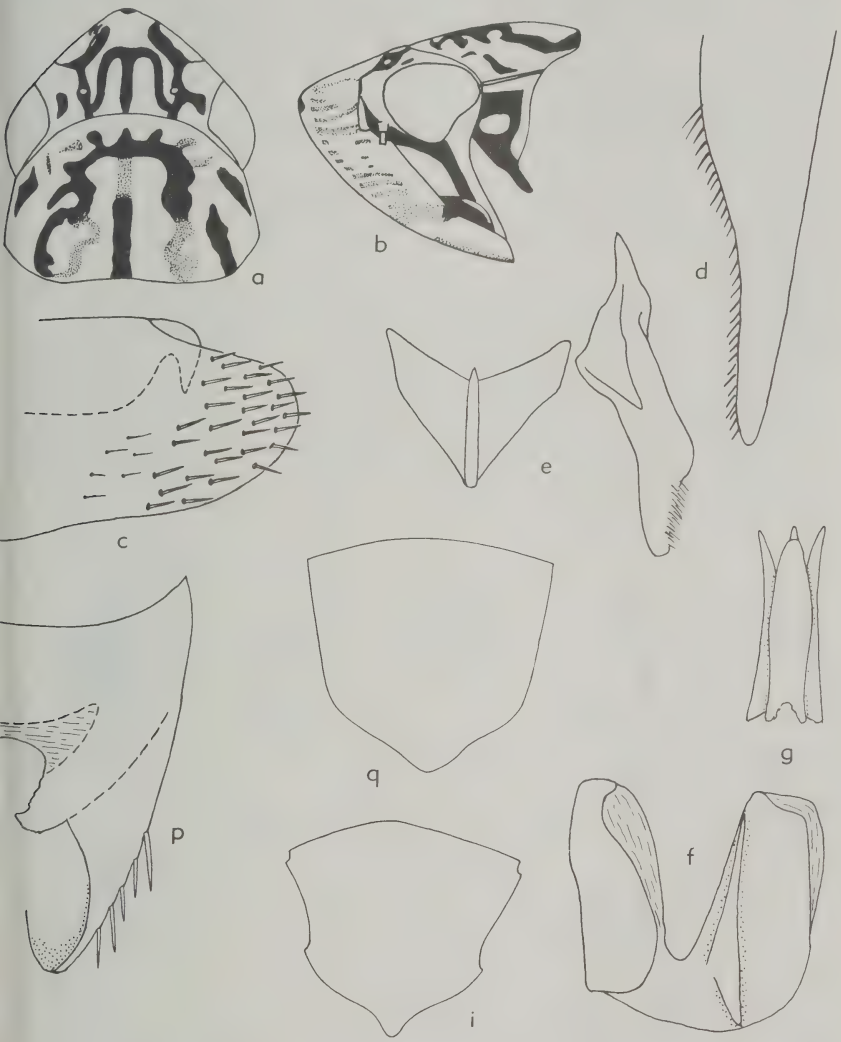


FIGURE 667.—*Amphigonalia gothica* (Signoret) (*i* from lectotype; *q* from specimen from Sturgis, South Dakota; remainder from Muskegon County, Michigan; plate not shown in *c;* only apical portion of aedeagus shown in *g*): *p,* Male pygofer, right side, from dorsal view; *q,* female abdominal sternum VII from macerated specimen.

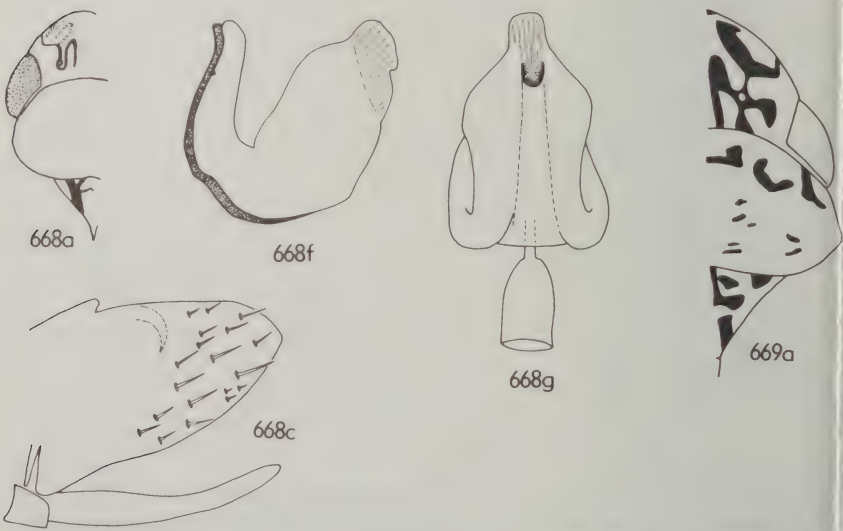
Female abdominal sternum VII with posterior margin produced and subobtusangular but rounded at apex. Ovipositor with second valvulae each broad throughout portion beyond basal curvature and with conspicuous dorsal slanting quadrate teeth which extend almost to acute apex.

Specimens of *Amphigonalia* have been studied from localities from British Colombia and northeastern, southeastern and central U. S. A., from Nevada, Texas, Arizona, California, and from Mexico, and Guatemala.

Amphigonalia, new genus, is the segregate Oman (1949a:73) and others referred to as *Neokolla* Melichar. But China's (1938d:134) designation of *Tettigonia hieroglyphica* Say as type-species of *Neokolla* and Ball's (1901e:17 and plate III, fig. 1) interpretation of *hieroglyphica* dictate the relegation of *Neokolla* to synonymy under *Graphocephala* Van Duzee. *Amphigonalia* belongs to the *Isogonalia* complex of genera, discussed in the treatment of the latter. *Amphigonalia* is distinct in that paraphyses are absent, being represented by aedeagal processes, and also distinct in the presence of dorsal pygofer processes.

Most species of *Amphigonalia*, new genus, are similar externally to North American *Graphocephala* of the *hieroglyphica* group of species. *Amphigonalia* is distinct externally from these in its elongate-loop-shaped markings of the crown.

As mentioned in the introductory portion of Part 1 (p. 16) of the present work, the knees of the posterior legs in rest position do not extend forward to the posterior proepimeral margins in some specimens of this genus, a variation shared with a number of specimens of *Graphocephala* Van Duzee formerly placed in *Keonolla* Oman.



FIGURES 668, 669.—668, *Amphigonalia pusilla* (DeLong and Currie), holotype. 669, *A. notaticeps* (Fowler), lectotype.

My interpretation of *Neokolla aridella* DeLong rests mainly on specimens identified with the aid of the revision of DeLong and Currie (1959a). The male holotype of *Neokolla remina* DeLong and Currie appears to be conspecific with their *N. aridella* DeLong, and the descriptions of the male genitalia (p. 65) do not reveal the distinct male genital structures they specified in the diagnosis of *remina*. *N. aridella* is a variably marked species, and the DeLong collection has a long series marked differently from typical *aridella* and from the variety described as *remina*.

My interpretation of *Tettigonia gothica* Signoret is based chiefly on the original illustration, a species which cannot be the same as *T. hieroglyphica* Say in the sense of Ball's 1901b (pl. III, fig. 1) interpretation of the latter. Ball's

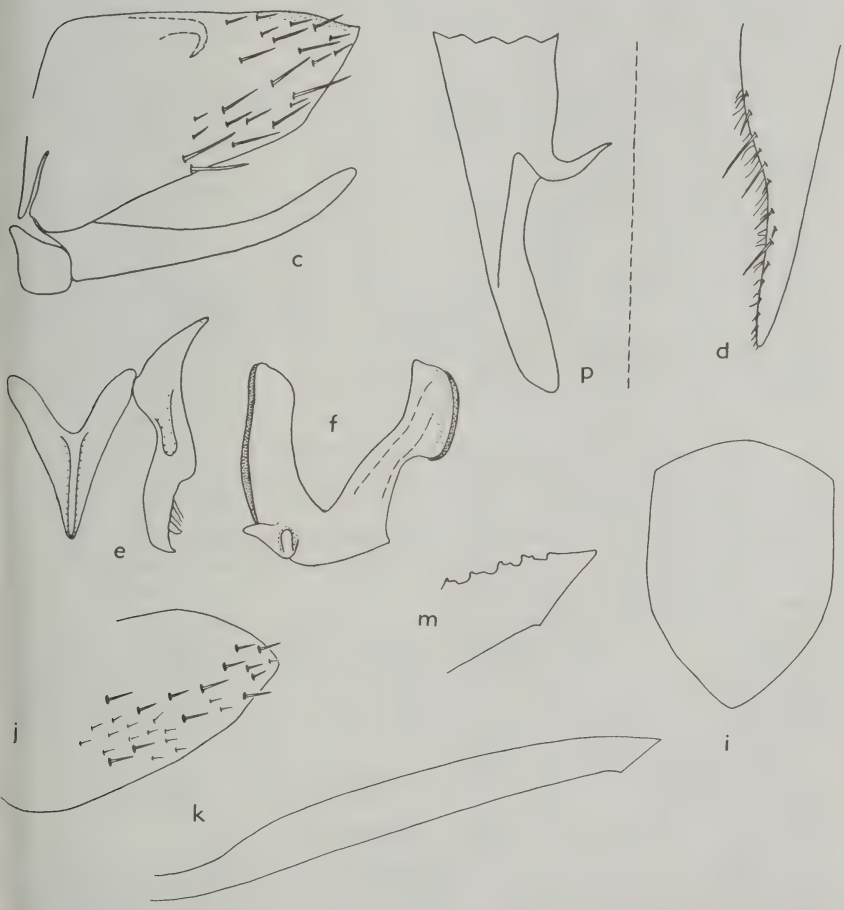


FIGURE 670.—*Amphigonalia severini* (DeLong) (*f* from specimen from Sierra Ancha Mountains, Arizona; *i-k, m,* from Chiricahua Mountains, Arizona, remainder from Huachuca Mountains, Arizona): *p,* Male pygofer apex, left side, from dorsal view.

1901b treatment is the oldest I can relate to species I have studied, including Ball-determined ones. Oman's (1947a:196) selection of a lectotype of *Tettigonia hieroglyphica* var. *dolobrata* Ball is consistent with Ball's determination and illustration. The interpretation of Lawson (1920a:86) is consistent with Oman's lectotype of *dolobrata* as are probably most of those authors before Lawson listed by Metcalf in his catalogue (1965a:280). *T. hieroglyphica* and its synonym *dolobrata* are surely not the same as Signoret's illustration of *gothica* and they are properly placed in *Graphocephala* as the latter is delimited here. On the basis of a single specimen from the Baker collection bearing the determination-label "Tettigonia gothica Sign. (= similis Woodw.)" and the locality label; "Can. 2220" (which Dr. J. P. Kramer found to be Toronto, summer, 1896, coll. J. C. Crew) in Baker's writing, I agree with Ball's disposition of the nominal species *Tettigonia similis* Woodworth as a junior synonym of *gothica* (Signoret).

My interpretaton of *Tettigonia notaticeps* Fowler is based on examination of the female lectotype and a comparison of specimens with the illustration (fig. 669) which Dr. W. J. Knight kindly sent me. The species appears to be close to *Amphigonalia aridella* (DeLong).

The present interpretation of *Neokolla pusilla* DeLong and Currie is based on a study of the holotype (fig. 668).

My determinations of *Neokolla severini* DeLong and its nominal subspecies *hamula* DeLong and Currie are based on descriptions and illustrations in DeLong and Currie (1959a). The aedeagal processes shown for *severini* in their illustrations of the aedeagus are the dorsal aedeagal apodemes. The aedeagal processes are actually rudimentary, as shown in the present illustration (fig. 670*f*).

SPECIES OF *AMPHIGONALIA*

aridella (DeLong), 1948c:144 (*Neokolla*). U. S. A.: Ariz., Tex.; Mex: Pueblo, Guerrero. New combination.

remina (DeLong and Currie), 1959a:65 (*Neokolla*). New synonymy.

gothica (Signoret), 1854b:345 (*Tettigonia*). NE., SE., Central U. S. A.; British Colombia. New combination.

similis (Woodworth), 1890a:25 (*Tettigonia*).

notaticeps (Fowler), 1900c:273 (*Tettigonia*). Guatemala. New combination.

pusilla (DeLong and Currie), 1959a:61 (*Neokolla*). Mexico: Hidalgo. New combination.

severini (DeLong), 1948c:142 (*Neokolla*). Tex., N. Mex., Ariz., Nev., Calif., Lower California. New combination.

hamula (DeLong and Currie), 1959a:64 (*Neokolla severini* subsp.).

KEY TO MALES OF *AMPHIGONALIA*

(*A. notaticeps* (Fowler) (fig. 669), known only from female, not included)

1. Aedeagus without processes ..... *pusilla* (DeLong and Currie) (fig. 668)
   Aedeagus with processes 2

2. Aedeagus with processes extending to, or nearly to apex of shaft 3
   Aedeagus with processes greatly reduced (fig. 670*f*) and not extending towards apex of shaft ..... *severini* (DeLong) (fig. 670)

3. Shaft broad compared with processes, and very short (fig. 667*f*)
gothica (Signoret) (fig. 667)
Shaft much more slender and elongate; processes, at their bases, as wide as shaft ..... *aridella* (DeLong) (fig. 666)

117. Genus ALLOGONIA Melichar

Figures 671-677

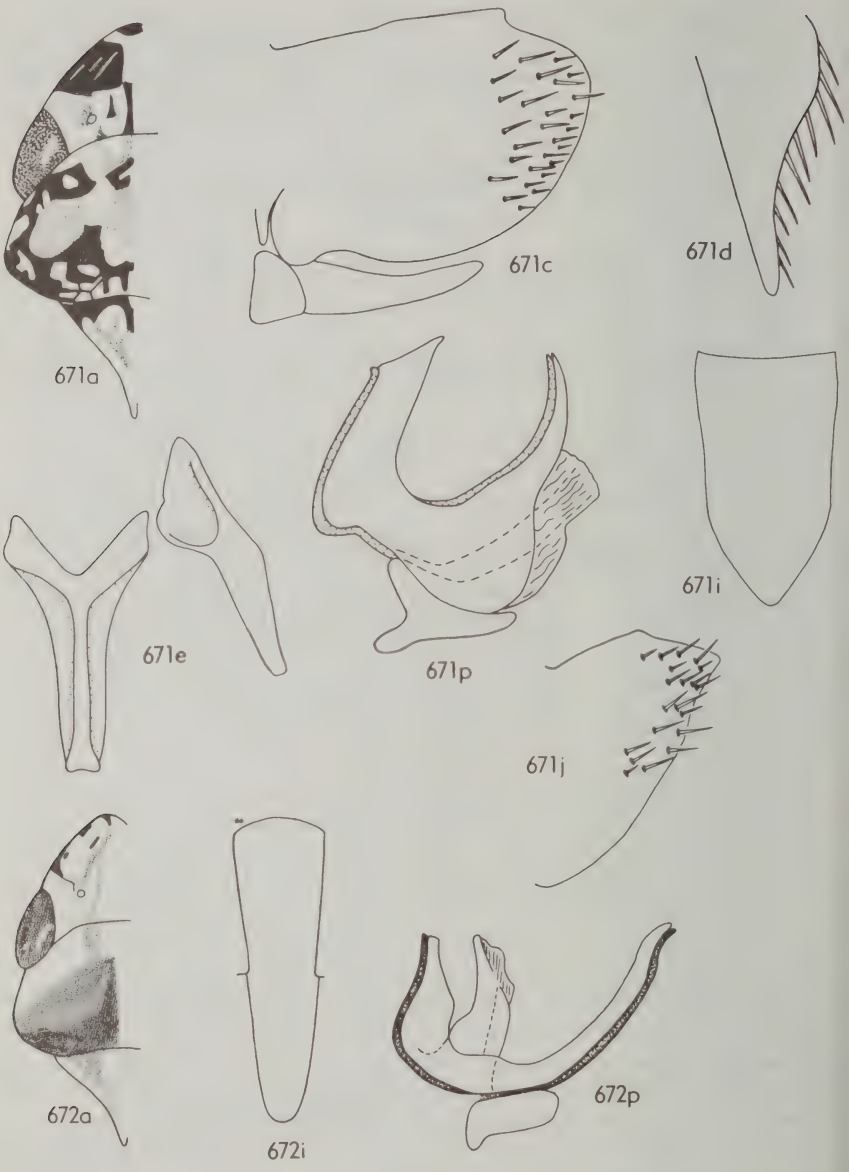
Allogonia Melichar, 1926a:343. Type-species: *Tettigonia concinnula* Fowler, by subsequent designation of China (1938d:184).

Length 5.3-7.5 mm.

Head well produced, median length of crown from two-thirds of to slightly greater than interocular width, and from four-tenths to six-tenths transocular width, without a carina at transition from crown to face, ocelli located on or behind a line between anterior eye angles, with relative distance of each ocellus from median line of crown and adjacent anterior eye angle variable interspecifically, crown shallowly concave before ocelli, with or without a median fovea, usually with numerous irregularly arranged minute lenticular impressions as in *Amphigonalia,* new genus (exception: *completa* (Fowler)), but not as distinct, setae absent, lateral clypeal sutures extending onto crown but usually not attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical (*A. concinnula* (Fowler)) or oblique and rectilinear; face usually without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye (very narrow when present), clypeus usually flattened medially, muscle impressions distinct or not, transclypeal suture obscure medially, clypellus with profile of its upper portion continuing contour of clypeus, its lower portion slightly more nearly horizontal.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk of pronotum transversely rugose or not, not pubescent; scutellum transversely striate or not behind transverse sulcus. Forewing with at least inner apical cell membranous, veins elevated and distinct (exception: *completa*), with three closed anteapical cells of which the bases are proximal to a transverse line across the claval apex, without or with only one or very few supernumerary crossveins in anteapical cells; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, apex broadly rounded or truncate (*A. indutula,* n. sp.), with a number of macrosetae of varied size on posterior half; pygofer processes absent. Plates short, triangular, not extending posteriorly nearly as far as pygofer apex (exception: *indutula*), with uniseriate macrosetae. Style usually not extending posteriorly as far as apex of connective, narrowly rounded or truncate apically, without preapical lobe. Aedeagus symmetrical or very nearly so (exception: *completa*), shaft varying interspecifically, with or without processes. Paraphysis a short symmetrical (exception: *indutula*) median sclerite near aedeagal base.



FIGURES 671, 672.—671, *Allogonia flavivitta* (Fowler) (*a* from specimen from Tepatzlan, Mexico; *i*, *j*, from Carapan, Michoacán, Mexico; remainder from Mexico): *p*, Aedeagus and paraphysis, from lateral view. 672, *A. luculenta* (Fowler) (*a* from lectotype; *i* from specimen compared with lectotype; *p* from Santa Catalina Mountains, Arizona): *p*, Aedeagus and paraphysis, from lateral view.

FIGURE 673.—*Allogonia superflua* (Fowler) (*a, c, d, f, p,* from specimen from British Honduras; *q* from Tancitaro, Michoacán, Mexico; *r* from El Salto, Durango, Mexico; *s* from Jacala, Mexico; *t* from lectotype; remainder from Desierto de los Leones, Mexico): *p,* Style, connective, and paraphysis, from dorsal view; *q-t,* aedeagus and paraphysis, from lateral view; *u,* forewing apex, *v,* basalmost teeth of second valvula.

Female (unknown in *concinnula*) abdominal sternum VII elongate, with posterior margin convex. Ovipositor with second valvulae each expanded in portion beyond basal curvature, with widely spaced triangular teeth in basal portion of expanded portion, teeth slanting and quadrate more distally, apex acutangular. Pygofer narrowed and acute or narrowly rounded posterodorsally, macrosetae occurring dorsally and anteapically.

Specimens of *Allogonia*, new genus, have been studied from southern Arizona, central and southern Mexico, Honduras, El Salvador, Costa Rica, and Panama. *Allogonia* belongs to the *Isogonalia* (*q. v.*) complex of genera. Females differ from others in the complex in the more elongate abdominal sternum VII which is also more slender than in other genera. In the males the paraphyses consist of a short, usually symmetrical sclerite near the base of the aedeagus which may or may not have processes like those of *Amphigonalia*, new genus, and *Manzutus* Oman. There are no pygofer processes in males of *Allogonia*, and the male plates are shorter in relation to the pygofer, both features differing from *Amphigonalia*.

Tettigonia completa Fowler is identified here on the basis of a female specimen I compared with the lectotype in the British Museum.

My interpretation of *Tettigonia concinnula* Fowler is based on an examination of the male lectotype and a dissection of a male (fig. 674*a*, *c-e*, *p*) compared with this specimen in the British Museum.

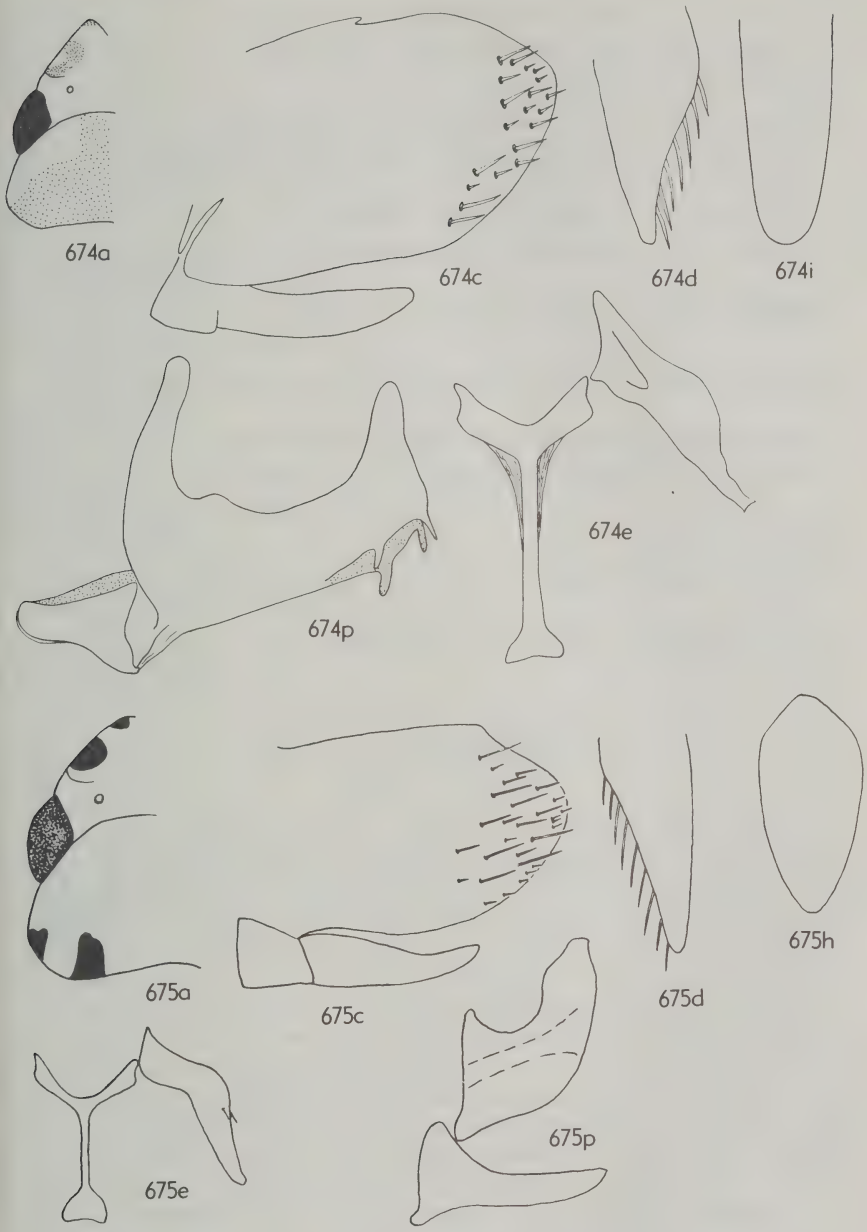
Tettigonia flavivitta Fowler has been identified in the sense of a male compared with the male lectotype (fig. 671). The male lectotype of *T. induta* Fowler has genitalia much like the present illustration (fig. 675).

I studied the female lectotype of *T. luculenta* Fowler in BM, and made drawings of the anterior dorsum and of abdominal sternum VII. The only specimens I have seen that appear to be conspecific are a pair from the Santa Catalina Mountains, Arizona, from the Ball collection (USNM). Other specimens similar in external appearance and from Mexican localities belong in *Graphocephala*.

My identification of *Tettigonia superflua* Fowler is based on a dissection of the male lectotype (fig. 673) of that species. Although I have seen the lectotype of *T. robustula* Fowler, my interpretation of this species is based largely on specimens examined later and compared with Fowler's original illustration.

SPECIES OF *ALLOGONIA*

completa (Fowler), 1900b:268 (*Tettigonia*). Central and S. Mexico. New combination.
concinnula (Fowler), 1900d:287 (*Tettigonia*). S. Mexico.
flavivitta (Fowler), 1900b:271 (*Tettigonia*). S. Mexico. New combination.
induta (Fowler), 1900b:270 (*Tettigonia*). S. Mexico, Honduras, El Salvador, Costa Rica, Panama. New combination.
indutula, n. sp. S. Mexico.
luculenta (Fowler), 1900d:284 (*Tettigonia*). Arizona, S. Mexico. New combination.
superflua (Fowler), 1899d:248 (*Tettigonia*). Central and S. Mexico. New combination.
robustula (Fowler), 1900d:288 (*Tettigonia*). New synonymy.



FIGURES 674, 675.—674, *Allogonia concinnula* (Fowler) (*i* from specimen from Guerrero, Mexico; remainder from Omilteme, Guerrero): *p*, Aedeagus and paraphysis, from lateral view. 675, *A. induta* (Fowler) (from specimen from Chiriquí, Panama; *h* from ventral view): *p*, Aedeagus and paraphysis, from lateral view.

KEY TO MALES OF *ALLOGONIA*

1. Aedeagus with paired processes arising at base of shaft 2
   Aedeagus without basal processes 4

2. Forewing with an opaque broad yellow or ivory claval stripe from wing base along claval suture which it crosses beyond midlength
   flavivitta (Fowler) (fig. 671)
   Forewing without a conspicuous pale marking 3

3. Forewing with claval suture orange-margined
   luculenta (Fowler) (fig. 672)
   Forewing without orange stripe on claval suture
   superflua (Fowler) (fig. 673)

4. Pygofer truncate at apex; aedeagal shaft curved slightly sinistrad
   indutula, n. sp.
   Pygofer convex apically; aedeagal shaft in median plane 5

5. Aedeagus with a unilateral digitate process at apex
   completa (Fowler) (fig. 676)
   Aedeagus not so 6

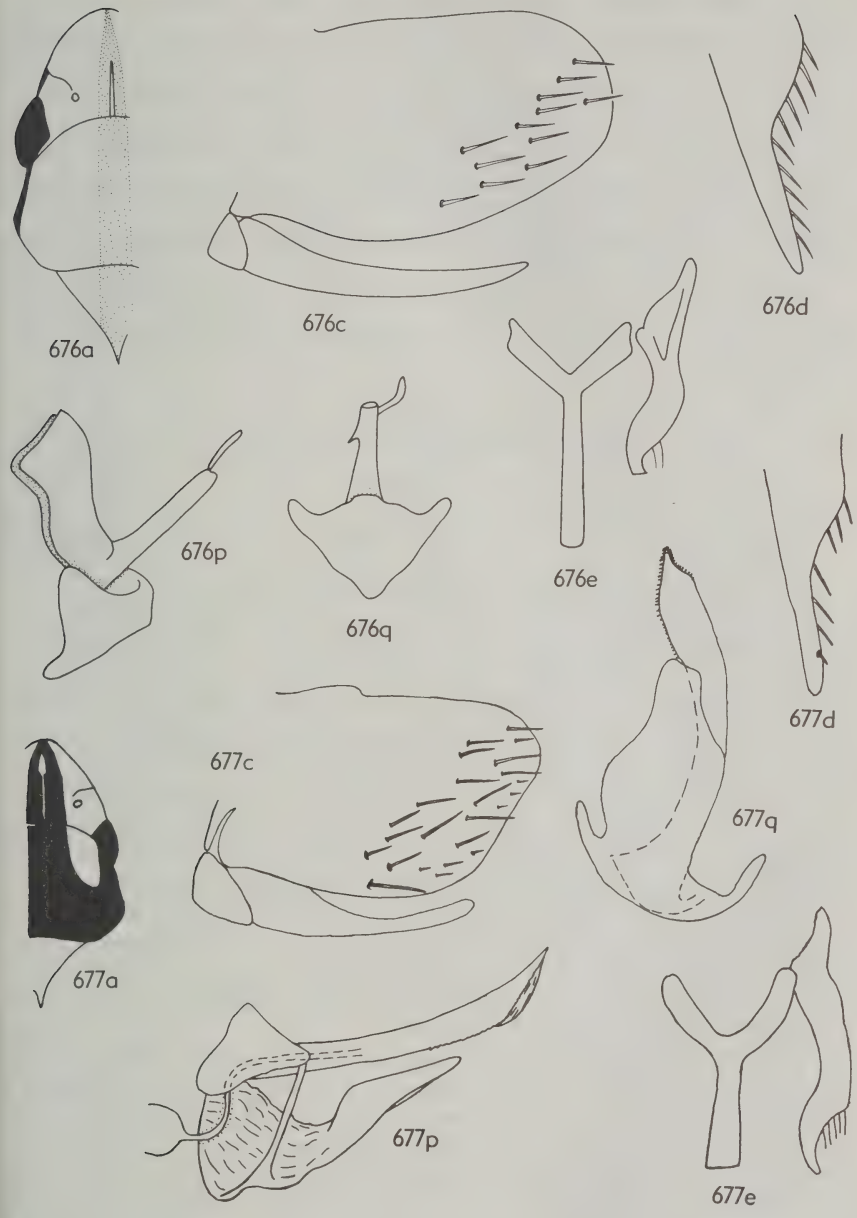
6. Aedeagus broad at apex and with small apicoventral lobes
   concinnula (Fowler) (fig. 674)
   Aedeagus tapered at apex and without apical lobes
   induta (Fowler) (fig. 675)

Allogonia indutula, NEW SPECIES

FIGURE 677, PAGE 837

Length of male 5.6-5.8 mm, of female 5.8-6.0 mm. Head with median length of crown from seven-tenths to almost nine-tenths interocular width, and from slightly more than one-half to six-tenths transocular width, ocelli located on a line with anterior eye angles and each equidistant from median line of crown and adjacent anterior eye angle, crown without a median fovea, lenticular impressions few or indistinct, sparse minute punctation present or absent, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges with anterior margins oblique and rectilinear; face without a vertical lenticular sclerite bordering each lateral clypeal suture, clypeus slightly flattened medially, muscle impressions not very distinct. Pronotum and scutellum not rugose; forewing with inner apical cell and apical portions of other apical cells membranous. Male pygofer with posterior margin obliquely truncate; plates extending posteriorly almost as far as pygofer apex; style extending posteriorly as far as apex of connective; aedeagus with shaft curved slightly sinistrad, without processes; paraphysis slightly asymmetrical, with a pair of basal arms extending dorsally and articulating with apical portion of dorsal aedeagal apodeme.

Crown yellow with anterolateral margins and a pair of lines near median line converging at apex, brown to black, pronotum brown except narrow



FIGURES 676, 677.—676, *Allogonia completa* (Fowler) (*a* from specimen from Río Tuxpan, Michoacán, Mexico; remainder from Guadalajara, Mexico): *p*, Aedeagus and paraphysis, from lateral view; *q*, same, from ventral view. 677, *A. indutula*, n. sp., from specimen from Cuernavaca, Mexico): *p*, Aedeagus and paraphysis, from lateral view; *q*, same from ventral view.

yellow median line near anterior margin and a yellow spot behind posteromesal eye angle; forewings brown with a spot in clavus at base, a round spot astride claval suture behind its midlength, and a spot in apical portions of anteapical cells, yellow to bluish-gray; face, thoracic pleura, and legs yellow except a dark line bordering each dorsopleural carina.

Holotype male, East of San Blas, Nayarit, Mexico, July 2, 1954 (R. E. Ryckman, C. P. Christenson, D. Spencer) and three females, Cuernavaca, Morelos, Mexico, May, 1945 (N. L. H. Krauss) on *Eugenia Jambos* L. (USNM). Three males, Cuernavaca, Morelos, Mexico, September 8, 1939 (DeLong collection in OSU).

A. indutula, n. sp. may be separated readily from other species of *Allogonia* by the truncate male pygofer and by the aedeagus, which curves out of the median plane.

118. Genus MANZUTUS Oman

Figures 678, 679

Manzutus Oman, 1949a:73. Type-species: *Cicadella huachucana* Ball, by original designation.

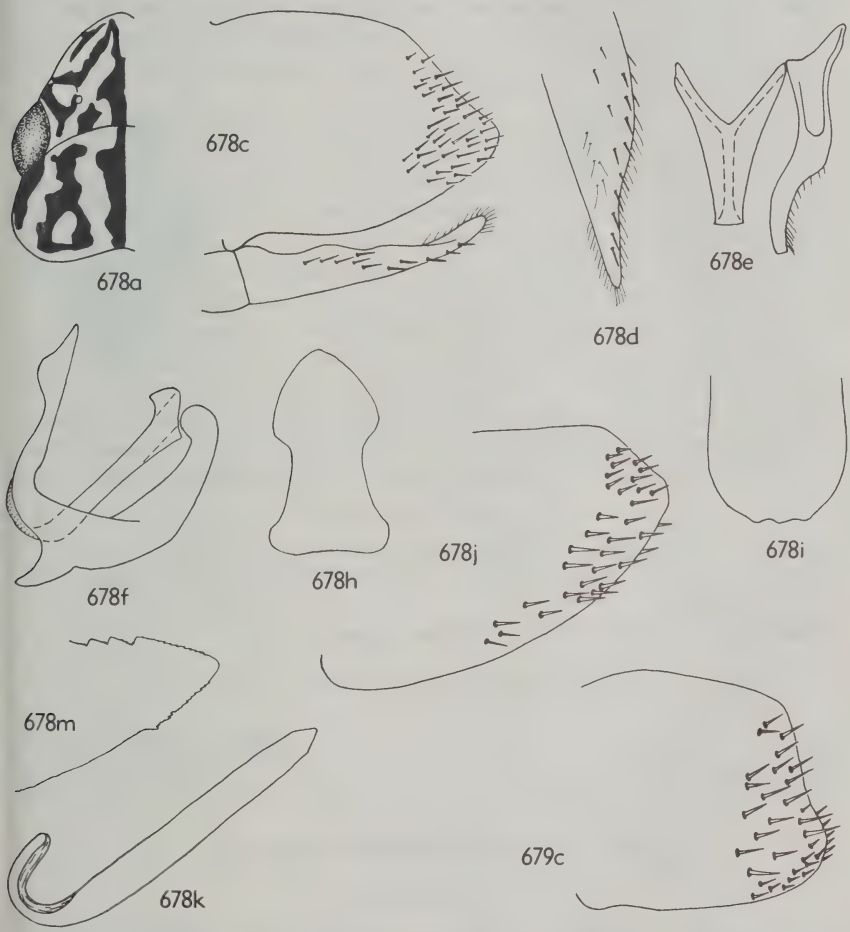
Length of male 7.0-11.4 mm, of female 7.3-11.3 mm.

Head well produced with anterior margin narrowly rounded in dorsal view; median length of crown varying from one-half to more than three-fourths interocular width and from slightly more than one-third to slightly more than one-half transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown convex or slightly flattened, with or without (variable intraspecifically) a transverse concavity across ocelli, crown without a median fovea, surface minutely rugose and with at least some lenticular impressions near middle of disk, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and varying from rectilinear to convex; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus convex, muscle impressions distinct, transclypeal suture obsolete, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width equal to or less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete or nearly so, posterior margin concave, disk usually transversely rugose, not pubescent; scutellum usually transversely rugose behind transverse sulcus. Forewing without a membrane; veins elevated and distinct, with three closed anteapical cells of which the bases are located proximal to a transverse line drawn through claval apex (the areoles subdivided by supernumerary cross veins in some specimens), with four apical cells, the base of fourth located more proximally than base of third; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere approximately equal to combined length of two

more distal tarsomeres, and plantar surface with the small setae of the usual size not in two parallel uniseriate rows, but more irregularly arranged and mixed with a few short, very stout setae.

Male genitalia: Pygofer moderately produced, with apex narrowly convex or truncate, with a number of macrosetae located anteapically and apically, pygofer processes absent. Plates triangular, extending as far posteriorly as pygofer apex, with longitudinally irregularly arranged microsetae and narrow macrosetae. Style extending posteriorly slightly farther than apex of connective, truncate apically, without a preapical lobe (with a lateral lobe occurring near midlength). Aedeagus with shaft narrow, slightly expanded apically and



FIGURES 678, 679.—678, *Manzutus mexicanus* (Signoret) (*i-k*, *m*, from specimen from Durango, Mexico; remainder from Arizona): *h*, Aedeagal process from caudoventral view. 679, *M. huachucanus* (Ball) (from specimen from Huachuca Mountains, Arizona; male plate not shown).

with a median dorsal flattened apical process which is slightly variable intraspecifically, with a broad flattened broadly truncate aedeagal process arising from ventral portion of atrium, extending parallel to and behind shaft to its apex. Paraphyses absent.

Female abdominal sternum VII strongly produced posteriorly with apex broadly and regularly convex except medially (fig. 678*i*). Genital chamber without a median or lateral sclerites. Ovipositor with second valvulae each broadened beyond basal curvature, with broad quadrate sloping teeth occurring throughout broader portion almost to apex, with minute secondaries on the quadrate teeth and minute denticles on posterodorsal and posteroventral anteapical margins; apex subacute.

Species of *Manzutus* occur in southern Arizona and as far southward in Mexico as Hidalgo and Michoacán. Oman (1949a:73) reported that *M. huachucanus* (Ball) lives on *Arctostaphylos* and (*M. multilineata* (Fowler)) = *M. mexicanus* (Signoret) on the Arbutus tree.

Manzutus Oman belongs to the *Isogonalia* complex of genera, discussed under the latter generic heading. *Manzutus* males are distinctive in the unpaired median symmetrical process of the aedeagus, and the females differ slightly from those of *Isogonalia*, new genus, and *Amphigonalia*, new genus, in the form of the apex of the second valvulae which are less acute apically (fig. 678*m*) than in *Isogonalia* and *Amphigonalia*. The divergence of these characters may be related to the restricted food plants of the species of *Manzutus*.

My interpretation of *Tettigonia multilineata* Fowler is based on a dissection of a male specimen compared with the Fowler type in the British Museum. The present interpretation of *T. mexicana* Signoret is based on a dissection of the lectotype of that species. I have based my interpretation of *Cicadella huachucana* Ball on specimens determined by Oman, from the USNM. The male genital structures of *huachucana* not illustrated are like those illustrated for *mexicana*.

SPECIES OF *MANZUTUS*

huachucanus (Ball), 1936a:19 (*Cicadella*). Arizona, northern Mexico.

mexicanus (Signoret), 1855d:789 (*Tettigonia*). Arizona, N. and central Mexico. New combination.

multilineata (Fowler), 1899d:241 (*Tettigonia*). New synonymy.

KEY TO SPECIES OF *MANZUTUS*

Length 7.3-7.9 mm ..... *huachucanus* (Ball) (fig. 679)

Length 10.0-11.4 mm ..... *mexicanus* (Signoret) (fig. 678)

119. Genus CAMPECHA Melichar

FIGURE 680

Campecha Melichar, 1925a:363. Type-species: *Tettigonia semirasa* Fowler (1899e:249), by original designation and monotypy.

Length of male 7.8-8.2 mm, of female 8.0-8.4 mm.

Head moderately produced with anterior margin rounded in dorsal view, median length of crown varying from slightly more than one-half to slightly

more than six-tenths interocular width, and from one-third to slightly more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located slightly behind a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with a broad shallow median depression and with lenticular impressions, lateral clypeal sutures extending onto crown but not attaining ocelli; without a vertical lenticular sclerite bordering lateral clypeal suture on each side, below eye; antennal ledges not protuberant, in lateral view with anterior margins slightly oblique; median clypeal area punctate, clypeus broadly convex, muscle impressions distinct, transclypeal suture entire or obsolete at middle, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, disk strongly transversely rugose and punctate, not pubescent;

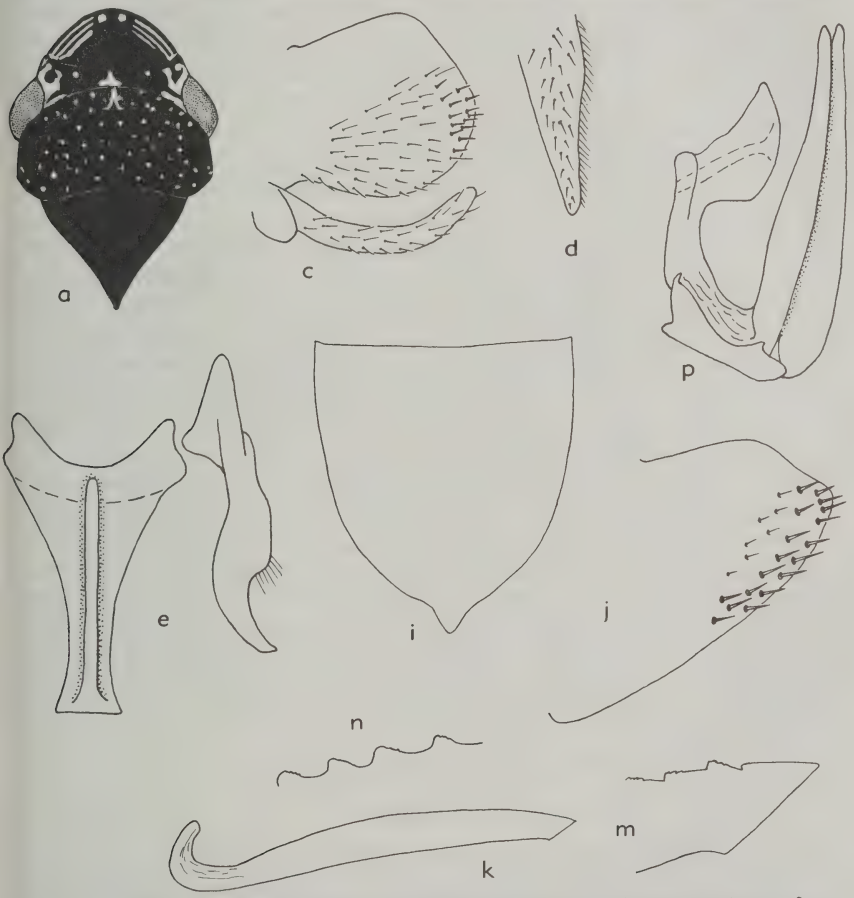


FIGURE 680.—*Campecha semirasa* (Fowler) (*i-k*, *m*, *n*, from specimen from Morelia, Michoacán, Mexico; remainder from Mexico): *p*, Aedeagus and paraphyses, from lateral view.

scutellum transversely striate behind transverse sulcus. Forewing with membrane including only inner apical cell, veins elevated, fairly distinct, with three closed anteapical cells of which the bases are all located proximal to a transverse line drawn through claval apex, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg at rest with knee not attaining posterior proepimeral margin; femoral setal formula 2:1:1; length of first tarsomere equal to or greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface. Sternal abdominal apodemes very short.

Male genitalia: Pygofer not strongly produced, posterior margin very broadly convex, with a number of microsetae on ventral half and a few submarginal small macrosetae near apex, pygofer processes absent. Plates triangular, extending posteriorly beyond apex of pygofer, with numerous irregularly arranged microsetae. Style not extending as far posteriorly as apex of connective, narrowed and truncate apically, with a distinct preapical lobe. Aedeagus with shaft very short, curved slightly dorsally, without shaft processes, dorsal apodemes very short, divergent, base of shaft extending ventrally and connected more firmly to the paraphyses (which could almost be regarded as aedeagal processes) than usual in the *Graphocephala* generic group; paraphyses with rami of almost equal size but arising at asymmetrical locations from their stalk.

Female abdominal sternum VII long and broad, longer than exposed portion of pygofer in ventral view, abruptly narrowed in apical portion, with apex angular. Genital chamber without a sclerite or sclerites. Ovipositor with second valvulae each strongly convex on dorsal margin beyond basal curvature and bearing widely spaced primary teeth, with weak secondaries on each of the primaries, apex acute, the apical angle being dorsal. Pygofer well produced, with a number of macrosetae and a few microsetae located near dorsal portion of posteroventral margin.

Campecha is known only from the type-species, *C. semirasa* (Fowler). It is known only from South Central Mexico. Nothing is known of its biology.

Campecha Melichar is one of the *Isogonalia* (q. v.) complex of genera, and is similar in the structure of the female genitalia to *Amphigonalia*, n. gen., and several other genera of the complex. The males are like most of those of *Graphocephala* Van Duzee in the asymmetry of the paraphyses, resulting from the rami arising at successive positions from the stalk. The short aedeagal shaft with the long basal portion below the atrium is distinctive for *Campecha*, in addition to the characters used in the key.

120. Genus DECUA Oman

Figures 681, 682

Decua Oman, 1949a:71. Type-species: *Cicadella cucurbita* Ball, by original designation.

Length of male 4.1-5.5 mm, of female 4.5 mm (based on two specimens).

Head strongly conically produced, with anterior margin narrowly rounded in dorsal view, median length of crown varying from slightly less than seven-tenths of, to almost equal to interocular width, and from slightly more than

four-tenths to slightly more than five-tenths transocular width, without a carina at transition from crown to face, ocelli located on or before a line between anterior eye angles, each ocellus closer to adjacent anterior eye angle than to median line of crown, crown convex and without a transverse concavity across ocelli, without a median fovea, surface with lenticular impressions, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus strongly convex medially, median clypeal area punctate, muscle impressions distinct, transclypeal suture distinct throughout its length, clypellus not produced, its contour continuing profile of clypeus.

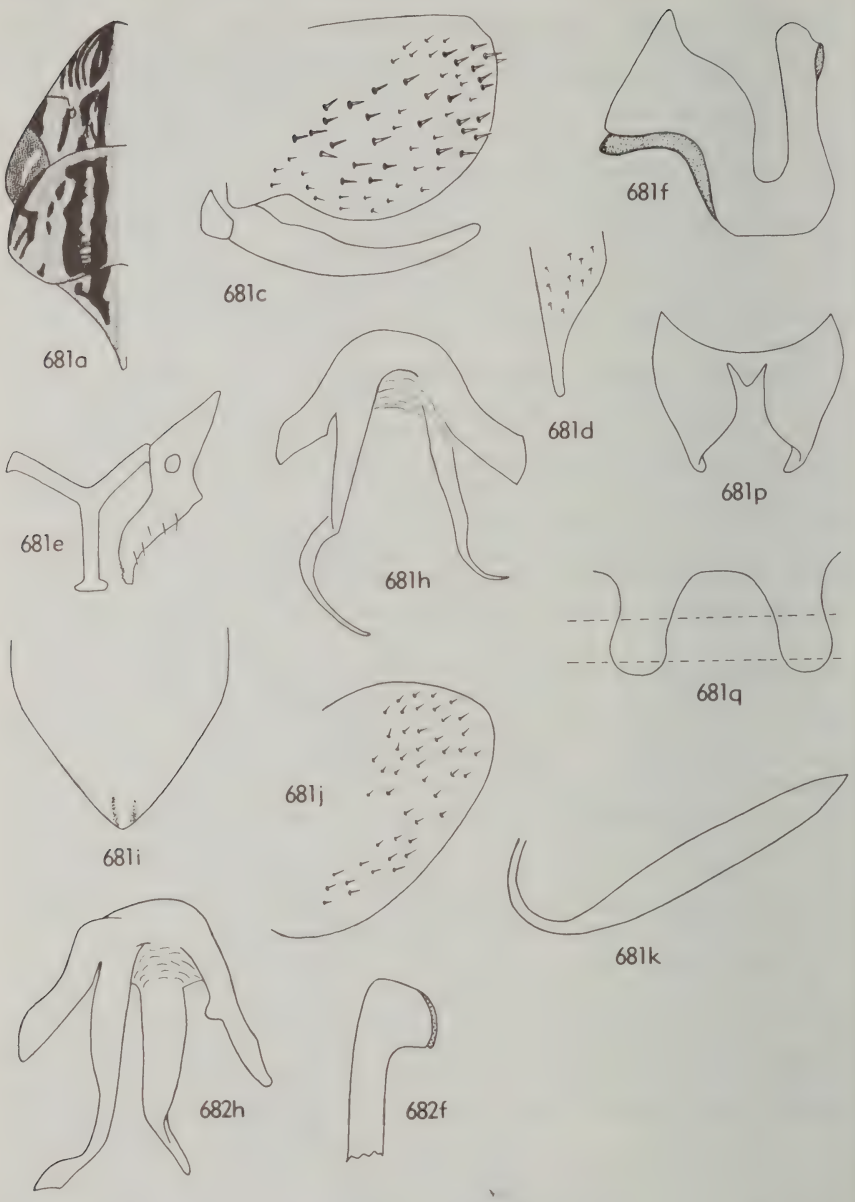
Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae not distinct, posterior margin concave, disk transversely rugose and with or without punctures; scutellum transversely striate behind transverse sulcus. Forewing without a membrane, veins elevated and distinct, with three closed anteapical cells all of which have their bases proximal to a transverse line drawn through claval apex, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:0; length of first tarsomere less than combined length of two more distal tarsomeres, and with two parallel rows of small setae of two sizes on plantar surface.

Male genitalia: Pygofer moderately produced, apex very broadly rounded, with a number of microsetae and a few very small interspersed macrosetae on most of surface, pygofer processes absent. Plates triangular, not extending posteriorly as far as pygofer apex, with a few microsetae not arranged in rows. Style extending posteriorly as far as apex of connective, narrowly rounded apically, with a slight lateral lobe at midlength. Connective Y-shaped with arms narrow and widely divergent. Aedeagus with dorsal apodemes wide and strongly divergent, shaft without processes, gonopore anteapical on caudal margin. Paraphyses paired, asymmetrical, but of almost equal length.

Female of type-speces unknown (see fig. 681 of *D. curta* (Beamer)).

Species of *Decua* Oman are known to occur in Arizona and New Mexico. *Decua* Oman belongs to the *Isogonalia* complex of genera (p. 819). In *D. curta* (Beamer), the female has only microsetae on the pygofer, but with second valvulae of the ovipositor and with abdominal sternum VII as in *Campecha* Melichar and *Amphigonalia*, new genus. In the paraphyses of the male, the degree of asymmetry is less pronounced than in many species of *Graphocephala* Van Duzee, or in *Campecha*. The reduced number (6 in the few specimens studied) of setae in posterior tibial row 2 is rare in the generic complex, even in small species. The antennal ledges are punctate in *Decua*; rugose in other genera in the complex.

In the original description of *Decua cucurbita*, Ball stated that it occurred on *Cucurbita digitata*. Beamer stated that *D. curta* occurred in grass in his original description.



FIGURES 681, 682.—681, *Decua curta* (Beamer) from paratypes from Roswell, New Mexico; *h* from caudoventral view, numerous dispersed microsetae not shown in *i*): *p*, Male pygofer from dorsal view; *q*, sternal abdominal apodemes, broken lines representing conjunctivae behind origin of apodemes. 682, *D. cucurbita* (Ball) (from allotype; only aedeagal apex shown in *f*, *h*, from caudoventral view).

My interpretation of *Decua cucurbita* (Ball) is based on the male allotype and two additional males (USNM). *D. curta* (Beamer) as interpreted here, is based on a study of four paratypes (USNM).

The degree of intraspecific variation in the male genitalia needs additional study, but there seems little doubt that the two species are distinct. Beamer collected both species on the same date in Roswell, New Mexico, and they appear quite different. The male genital characters of *cucurbita* not illustrated are like those illustrated for *curta*.

SPECIES OF *DECUA*

cucurbita (Ball), 1936a:20 (*Cicadella*). Arizona, New Mexico.
curta (Beamer), 1937a:13 (*Cicadella*). New Mexico.

KEY TO SPECIES OF *DECUA*

Length 5.1-5.5 mm; median pale stripe of anterior dorsum not continued over clypeus ..... *cucurbita* (Ball) (fig. 682)
Length 4.1-4.5 mm; median pale stripe of anterior dorsum continued over apex of crown and over clypeus ..... *curta* (Beamer) (fig. 681)

121. ALLONOLLA, NEW GENUS

FIGURES 683, 684

Type-species: *Allonolla smithi*, new species.

Length of male 4.7-6.5 mm, of female 4.8-8.0 mm.

Head not strongly produced, its median length varying from one-half to six-tenths interocular width and from slightly more than one-third to approximately four-tenths transocular width, apex approximately a right angle in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, disk of crown variable interspecifically, transversely shallowly concave or not, surface of disk of crown varying from coarsely punctate with round punctures or with lenticular punctures, to longitudinally rugose, lateral clypeal sutures usually extending onto crown (obscured by sculpturing of surface when not so) and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins slightly oblique and rectilinear or slightly concave; clypeus convex or very slightly flattened, coarsely punctate medially, muscle impressions distinct, face with or without (rubbed?) pubescence on its lower portion, transclypeal suture obsolete medially, clypellus with profile of its lower portion more strongly oblique than contour of remainder of face.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave, disk punctate and transversely rugose, with or without sparse pubescence; scutellum with sculpturing varying interspecifically. Forewing without an appendix, without a membrane; veins elevated and distinct, with four apical cells and base of fourth located more proximally than base of third, with three closed anteapical cells, of which base of first is more distal than base of middle cell and base of outer is angular and variable, texture coriaceous, and

punctate or rugose, often with fine sparse pubescence; forewings of female in rest position exposing apex of ovipositor or not. Hindleg with femoral setal formula 2:1:1 or 2:0:0 (variable interspecifically), tibiae with setae of rows 1 and 2 sparsely spaced and with intercalary microsetae, first tarsomere with length equal to or greater than combined length of two more distal tarsomeres and with numerous irregularly spaced small setae on plantar surface.

Male genitalia: Pygofer weakly produced, posterodorsal margin obliquely sloping to convex apex at middle of posterior margin, with a number of small macrosetae, or of microsetae, without pygofer processes. Plates narrowly triangular, extending as far posteriorly as apex of pygofer, with a number of irregularly arranged microsetae. Style slender, without preapical lobe, acute or truncate at apex. Connective Y-shaped, with arms as long as stem. Aedeagus very short, not strongly curved, rounded apically, without processes. Paraphyses asymmetrical, similar to those of *Graphocephala* spp. (e.g. *G. coccinea* (Forster)).

Female abdominal sternum VII transverse, slightly produced posteriorly and bluntly angulate apically, surface with numerous irregularly arranged microsetae. Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvulae each gradually broadened beginning in basal fifth, with dorsal teeth in slightly more than apical half, the primaries not prominent near base, where arrangement is consequently an alternation of a convexity without denticles with a number of minute denticles, the more distal primaries more elevated and the denticles appearing as secondaries, with a number of anteapical dorsal and ventral denticles, apex acute.

Both species are brown to black. The genus *Allonolla* is known only from Mexico. The male genitalia are similar to a number of species of *Graphocephala* Van Duzee. The absence of an appendix in the forewing is different from almost all other species in the Cicadellinae. The only biological information available is that two specimens were intercepted on a species of orchid from Michoacán, Mexico.

KEY TO SPECIES OF *ALLONOLLA*

Length less than 5 mm; male paraphyses close together at bases, pygofer with macrosetae ..... *usingeri*, n. sp., page 848

Length 5.6 mm or more; male paraphyses separated more at bases, pygofer with microsetae only ..... *smithi*, n. sp.

Allonolla smithi, NEW SPECIES

FIGURE 683

Length of male 6.1-6.5 mm, of female 5.6-8.0 mm. Head with median length of crown slightly less than six-tenths interocular width, and approximately four-tenths transocular width, disk of crown broadly, shallowly concave, its surface longitudinally rugose medially and obliquely rugose on each side of each ocellus, or with lenticular punctations with their long axes so oriented, with small punctations on each side of apex along margin between

crown and face; scutellum with basal angles granulate, mediobasal portion punctate, surface transversely rugose at transverse sulcus, posterior portion either punctate or transversely rugose; forewing with surface transversely rugose from base to bases of anteapical cells; hindleg with femoral setal formula 2:0:0. Male pygofer without macrosetae, style narrowed and subacute at apex, paraphyses with bases of rami well separated and with one of the rami distinctly longer than the other. Female with apices of second valvulae slightly less acute than in *A. usingeri*, n sp.

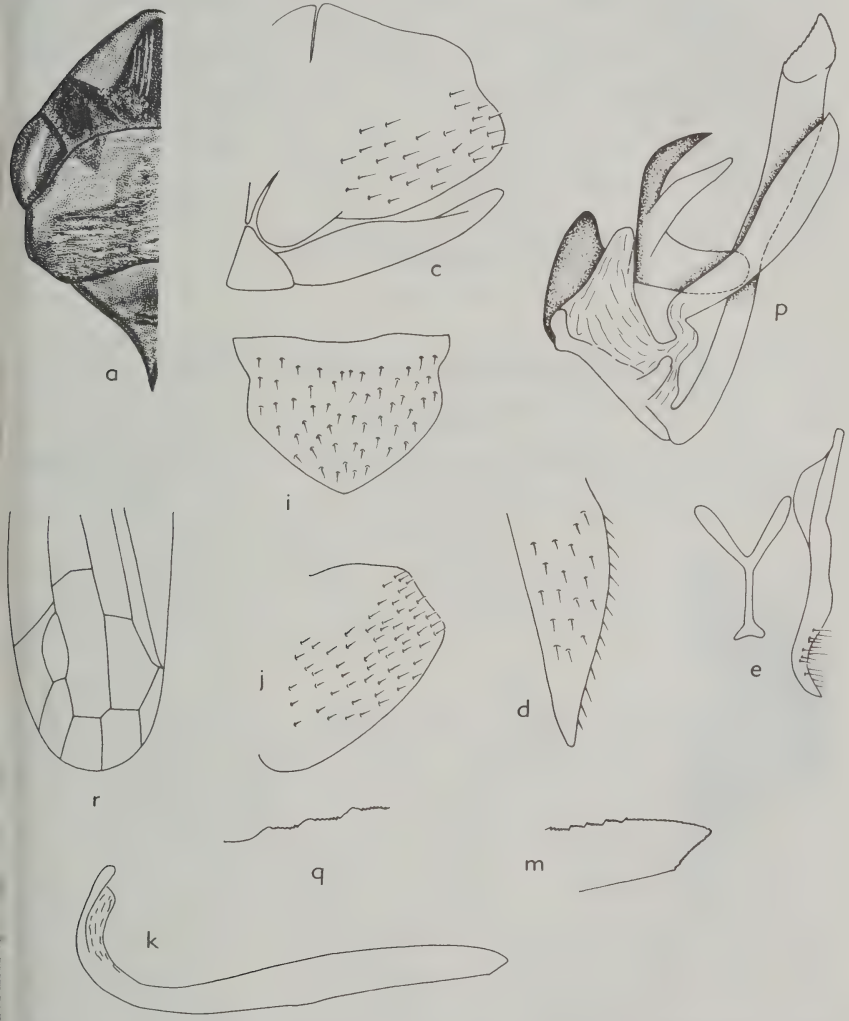


FIGURE 683.—*Allonolla smithi*, n. sp. (*i-k*, *m*, *q*, from specimen from Michoacán, Mexico; *r* from Tancitaro, Michoacán, Mexico; remainder from holotype): *p*, Aedeagus and paraphyses, from lateral view; *q*, basalmost teeth of second valvula; *r*, forewing apex.

Color of dorsum, including wings, brown to black, variable; face, pleura, and venter brown, variably marked with black and dull yellow. Pronotum and forewings, at least, sparsely pubescent.

Holotype male, 4 mi. west of Mazamitla, Jalisco, Mexico, October 16, 1950, 6800 ft. (Ray F. Smith) (AMNH). One male, two females, and one specimen without abdomen, Real de Arriba, Temescaltepec, Mexico, May 31, 1933 (3) and May 23, 1933 (1) (H. E. Hinton and R. L. Usinger) (CAS). Two females, "HO-27" and "HO", Tancitaro, Michoacán, Mexico, July 24, 1940 and August 5, 1940 (D. M. DeLong) (DeLong collection, OSU). One male and one female on same pin, Morelia, Michoacán, Mexico, intercepted on Orchid spp., Brownsville, Texas, November 5, 1966 by Ayers, Brown, Heinrich and Burgess (USDA-ARS lot no. 66 30255 and 6) (USNM).

This species is named in honor of Dr. Ray F. Smith, who collected the holotype. *A. smithi*, n. sp., is similar to *A. usingeri*, n. sp., below, in the discussion of which distinguishing characters are treated.

Allonolla usingeri, NEW SPECIES

FIGURE 684

Length of male 4.7 mm, of female 4.8 mm. Head with median length varying from slightly less than six-tenths to six-tenths interocular width and slightly more than one-third transocular width, disk of crown not transversely concave, its surface coarsely punctate with round punctures; scutellum punctate; forewings punctate from base to apical cells; hindleg with femoral setal formula 2:1:1. Male pygofer with small macrosetae, style truncate

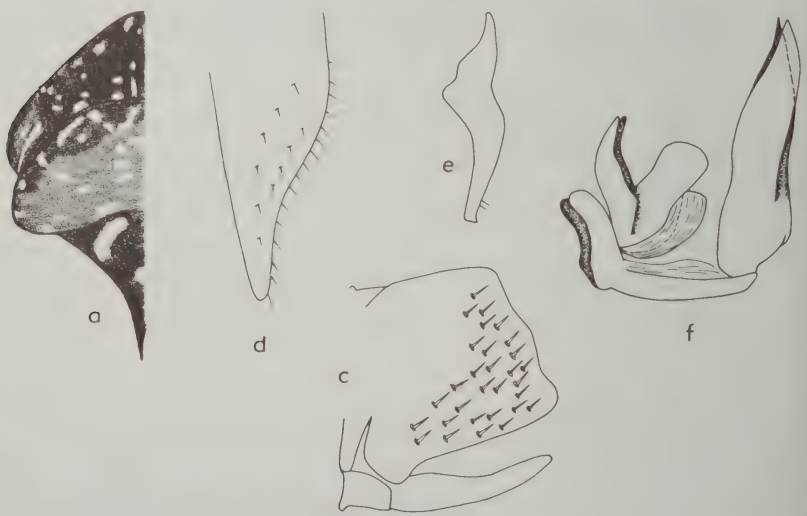


FIGURE 684.—*Allonolla usingeri*, n. sp., holotype (connective not shown in *e*): *p*, Aedeagus and paraphyses, from lateral view.

apically, paraphyses with bases of rami not separated and with the rami approximately the same length. Female with apices of second valvulae of ovipositor slightly more acute than in *A. smithi*, n. sp.

Color of crown, anterior portion of pronotum, and scutellum black, remainder of pronotum brown, crown and pronotum with a number of irregular yellow spots, scutellum with a pair of diagonal yellow lines, convergent anteriorly, and a median yellow spot behind midlength; forewing brown with a number of irregular yellow spots; face brown with lateral areas of clypeus black, and with large yellow spots on clypeus and clypellus, genae and propleura brown marked with yellow, remainder of thorax black beneath, with few yellow markings, legs brown with irregular yellow spots.

Holotype male, Real de Arriba, Temescaltepec, Mexico, May 24, 1933 (H. E. Hinton and R. L. Usinger) and one female, same data except date which is May 31, 1933 (CAS).

The species is named in honor of the late Dr. Robert Usinger who made major contributions to the taxonomy of Hemiptera. *A. usingeri*, n. sp., differs from *A. smithi*, n. sp., in the characters used in the key. Also, the disk of the crown is not concave, as it is in *smithi*, and the punctures on the disk are round.

122. Genus GRAPHOCEPHALA Van Duzee

Figures 685-732

Graphocephala Van Duzee, 1916a:66. Type-species: *Cicada coccinea* Forster, by original designation.

Neokolla Melichar, 1926a:343. Type-species: *Tettigonia hieroglyphica* Say, by subsequent designation of China, 1938d:184. New synonymy.

Hordnia Oman, 1949a:70. Type-species: *Tettigonia atropunctata* Signoret by original designation of its junior synonym, *Tettigonia circellata* (Baker). New synonymy.

Marathonia Oman, 1949a:72. Type-species: *Cicadella marathonensis* Olsen, by original designation. New synonymy.

Length 4.2-9.4 mm.

Head weakly to well produced, anterior margin subangulate to broadly rounded in dorsal view, without a carina at transition from crown to face (exception: *G. nigrifascia* (Walker)), ocelli with location variable interspecifically, crown varying from slightly convex to slightly concave, seldom variable intraspecifically, with a transverse concavity before ocelli, without a median fovea, surface usually with shallow lenticular impressions near middle of disk, or at least behind ocelli, punctate also in some species, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins varying from vertical to oblique and from convex (most often) to rectilinear; median clypeal area granular to punctate, usually without a lenticular facial sclerite bordering lateral clypeal suture on each side (extremely narrow when present) below eye, clypeus convex medially or nearly flattened, muscle impressions distinct or not, transclypeal suture usually obsolete medially, clypellus with its contour continuing profile of clypeus.

Thorax with pronotal width varying interspecifically compared with transocular width of head, from less than to greater than latter, lateral pronotal margins parallel or convergent anteriorly, dorsopleural carinae complete, disk transversely rugulose or not, not pubescent; scutellum transversely rugose or not behind transverse sulcus (variable interspecifically, and intraspecifically in some species). Forewing with membrane distinct or not; veins distinct or not (varying interspecifically), with three closed anteapical cells (exception: *G. versuta* (Say), see below), with four apical cells, the base of fourth usually more proximal than base of third (exceptions: *G. delongi*, n. sp., some specimens of *G. coccinea* (Forster), some specimens of *G. aurolineata* (Fowler)), usually without an anteapical plexus of veins (but with outer anteapical cell a plexus in *versuta*, and with supernumerary crossveins common in *coccinea*, and occurring occasionally in other species); forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 (exception: *G. simulata*, n. sp.), length of first tarsomere variable in comparison to combined length of two more apical tarsomeres and with two rows of small setae (occasionally joined at base by additional setae between rows) on plantar surface.

Male genitalia: Pygofer slightly to moderately produced, apex convex, with macrosetae confined to apical half of disk, processes arising on dorsal margin or (more commonly) absent. Plates triangular, varying interspecifically in length from very short to extending posteriorly as far as or farther than pygofer apex, each with macro- or microsetae or both, arranged in one or several rows or with a more irregular pattern. Style extending posteriorly to a varying degree compared to extent of connective, varying interspecifically, without a distinct preapical lobe.

Aedeagus with shaft usually short, almost always without processes (exceptions: *G. simulata*, n. sp., and *G. sasaima*, n. sp.), dorsal apodemes varying specifically from large and conspicuous to very small. Paraphyses asymmetrical, consisting of a basis and one ramus that lies in a plane that is not median, or two rami with their points of origin not symmetrical, the rami not uniform in size and often dissimilar in form.

Female abdominal sternum VII with posterior margin produced posteriorly, the apex varying from rounded to obtusely or acutely angular, rarely narrowly notched medially. Ovipositor with second valvulae each expanded in apical three-fifths and usually bearing widely-spaced teeth (exceptions: *G. guerreroensis* (Fowler), *G. appropinquans* (Fowler), *G. marathonensis* (Olsen), and *G. nigrifascia* (Walker)), apex varying from acutangular to rounded (*appropinquans*). Pygofer fairly broadly rounded apically, with a number of anteapical macrosetae which extend anteroventrally parallel to posteroventral margin in some species.

Specimens of *Graphocephala* have been studied from localities from Ontario, Canada, eastward to Maine and westward to California, and southward through Mexico and Central America as far as Colombia and French Guiana. *G. fennahi*, n. sp., has been introduced to and is established in England.

The genus *Graphocephala* is large and difficult to characterize. This has added to the complexity of the generic key. Most species of *Graphocephala* have

Graphocophala Generic Group

97. *Cinerogonalia*

115. Isogonalia
116. Amphigonalia
117. Allogonia
118. Manzutus
119. Campecha
120. Decua
121. Allonolla
122. Graphocephala
123. Plummerella
124. Naltaca
125. Barbinolla

126. Caribovia
127. Apogonalia
132. Mareja

133. Graphogonalia
134. Crossogonalia
138. Stephanolla
135. Segonalia
136. Coronigonalia
137. Coronigoniella
128. Macugonalia
130. Camaija
131. Hadria
149. Cibra
129. Ambigonalia
139. Ferrariana

140. Cuitlana
141. Tlagonalia
142. Caldwelliola
143. Borogonalia
144. Tortigonalia
145. Lautereria
146. Catagonalia
147. Tantogonalia

148. Laneola

lenticular impressions on the crown, and in all of the females dissected, the pygofer and abdominal sternum VII are similar to other genera of the *Graphocephala* generic group (above). The second valvulae of the ovipositor are quite variable interspecifically in *Graphocephala*, varying from a common condition found in *coccinea* (fig. 686) to one in which the teeth are reduced (*G. atropunctata* (Signoret), fig. 721) or practically absent (*appropinquans*, fig. 712), and with the apex rounded, instead of acute. The toothed area is shorter, in *nigrifascia* (fig. 710), than in the other species studied. This degree of variation in the second valvulae within a single genus is very unusual in the Cicadellini. There is also much variation in the male genitalia, especially in the form of the asymmetrical paraphyses (figs. 701 and 707). Drastic reduction of these structures is a notable feature within *Graphocephala*. The aedeagus varies also,

but is most often short and without processes, and without the basal portion found in *Campecha* Melichar. The occurrence of rugae on the antennal ledges and of macrosetae on the female pygofer in *Graphocephala* will separate it from *Decua* Oman. The genitalia of the females of *nigrifascia* and *appropinquans* (fig. 712) are similar to those of *Stehlikiana*, new genus (see discussion of *Trichogonia* Breddin).

I have been unable to find a sufficient gap between *Proconia confluens* Uhler and other species treated below to justify retaining *Neokolla* Melichar as a distinct genus. *Hordnia* Oman and *Marathonia* Oman have been reduced for similar reasons. *Neokolla* Melichar, which Oman (1949a:73) used to include species with symmetrical male genitalia, has for its type-species *Tettigonia hieroglyphica* Say, of which the type-specimen no longer exists. I have examined a specimen determined as *hieroglyphica* by Ball, and agreeing with Ball's (1901e: pl. III, fig. 1) illustration, which has asymmetrical genitalia identical with those of Oman's lectotype of *Tettigonia dolobrata* (Ball). The resulting specific synonymy (see list of species) resulted in the reduction of *Neokolla* Melichar to synonymy under *Graphocephala*.

A series of *Graphocephala apicata*, n. sp., was collected by N. L. H. Krauss on *Lantana camara* L. in San Blas, Nayarit, Mexico, July 29, 1953 (USNM).

G. atropunctata (Signoret) was taken from leaves of *Lantana* in Casa Colorado, Nicaragua, November, 1959, by N. L. H. Krauss. This species (as *circellata* Baker) has been collected on a number of plants (see summary by Nielson, 1968c:117) and is an important vector of Pierce's disease of grapes and alfalfa. Additional biological studies are also cited by Nielson (*loc. cit.*).

Specimens of *G. aurora* (Baker) in the USNM were collected on *Eupatorium adenophorum* Sprengel.

G. coccinea (Forster) has been shown to feed on a number of plants in the U.S.A., including milkweed, and on several ornamental plants. DeLong (1948a:145) gave *Rubus* and *Forsythia* as examples of such plants on which economic damage may be inflicted. The species occurs in numbers on ornamental plantings of *Pittosporum* on the campus of North Carolina State University. Ballou (1935a:193) reported having collected *coccinea* on 23 species of plants in Costa Rica, and on 36 species in 1936 (1936b:463), the total list including a number of economic species. In Missouri, Mason and Yonke (1971b:115) reported adult *coccinea* feeding on *Silphium perfoliatum* L., *S. integrifolium* Michx., *Rosa multiflora* Thunb., *Cirsium* sp., *Asclepias* sp.; and last instar nymphs were collected on *Rhus aromatica* Ait., *Rosa multiflora*, and *Solidago* sp.

A series of *G. clepsydra* (Fowler) in the USNM was collected on *Pelargonium Zonale* Aiton, February 10, 1935 in San Rafael de Coronado, Costa Rica, by C. H. Ballou.

G. cythura (Baker) has been reported as a vector of Pierce's disease of grapes (Nielson, *op cit.*, p. 120) but not an effective one.

Señora Graciela Serrano Limon, in an unpublished thesis, reported *G. nigrifascia* (Walker) to have *Buddleia humboldtiana* Roem and Schultz as a host plant.

Three specimens of *G. pectoralis* (Fowler) in USNM were intercepted on *Tillandsia* sp.

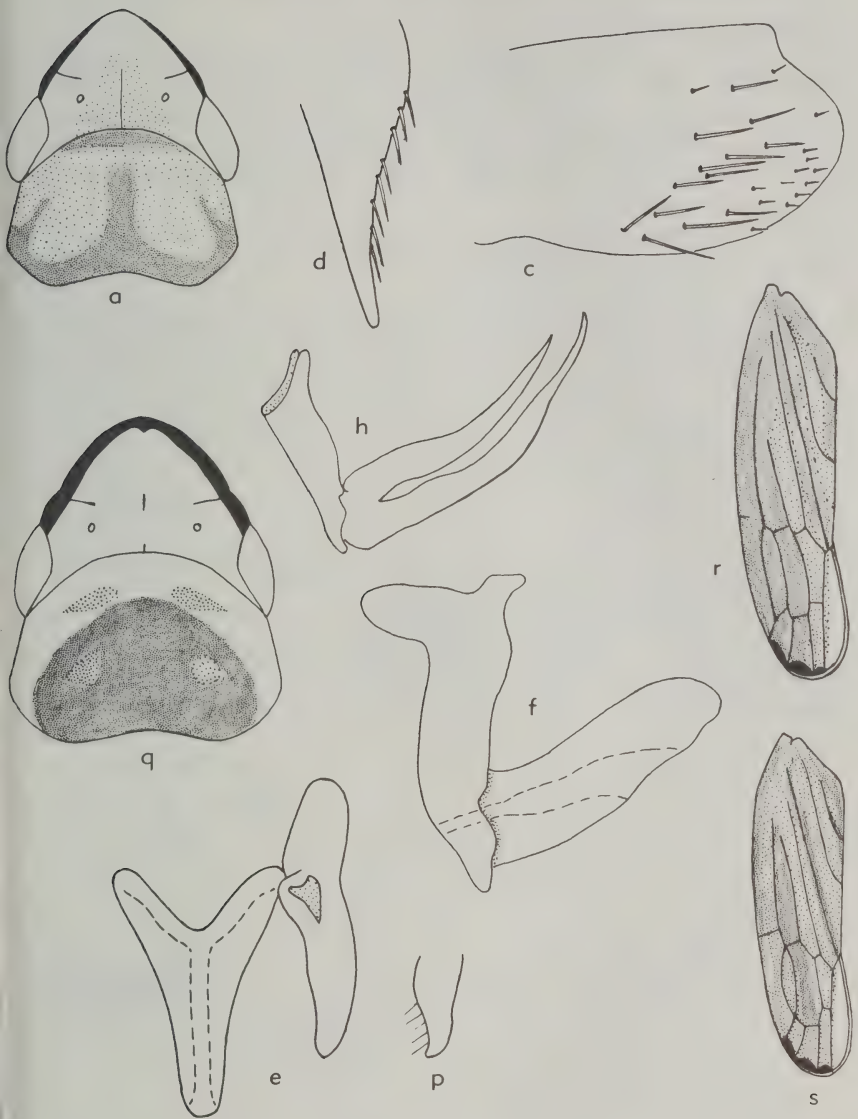


FIGURE 685.—*Graphocephala coccinea* (Forster) (see also fig. 686) (*a, c, f, h,* from specimen from Mayport, Florida; *d, e, p,* from Ontonogan County, Michigan; *q, r,* from Bar Harbor, Maine, *s,* from Cape Hatteras, North Carolina; plate not shown in *c; h* from lateral view): *p,* Style apex from lateral view; *q,* anterior dorsum; *r, s,* forewing. Closely stippled areas are green; sparsely stippled areas are red.

A series of *G. punctulata* (Signoret) was collected on corn in Vera Cruz, Mexico, by J. McKelvey.

A series of *G. rufimargo* (Walker) was collected on *Eupatorium adenophorum* Sprengel by N. L. H. Krauss in Morelos and Vera Cruz, Mexico (USNM).

Mason and Yonke (1971b:115) reported *G. versuta* feeding on *Desmodium* sp. in Missouri. Kincade, Hepner, and Laster (1970a) reported *versuta* to be common in soybean fields in Mississippi. Turner and Pollard (1959a) treated the life history of this species.

My interpretation of *Tettigonia albomaculata* Distant is based on a comparison of the present illustrations (fig. 716) with a specimen I compared with the type in the British Museum.

There are two specimens of *Tettigonia aurora* Baker in the USNM. A female, bearing labels: "Arizona,/C.U. Lot 34." and "Cornell U/Lot 45/Sub 410" and "Cotype No./U.S.N.M." and "Tettigonia/aurora/Uhl.MS" is here designated lectotype. My identification of *Tettigonia delicata* Fowler is based on a female specimen compared with the female lectotype, and a male subsequently associated with this specimen. Ball's (1901e, pl. IV, fig. 3) illustration of *dohrnii* Signoret is actually of a specimen of true *Graphocephala aurora* (Baker).

A male specimen, compared externally with the lectotype of *Tettigonia cervina* Fowler, agrees in male genitalia with figure 694.

The present interpretation of *Graphocephala coccinea* Forster follows the identifications of the vast majority of earlier workers. The earlier interpretation included *G. fennahi*, n. sp., described below, but the latter occurs in a restricted area compared with *coccinea*, and probably was not included in many series

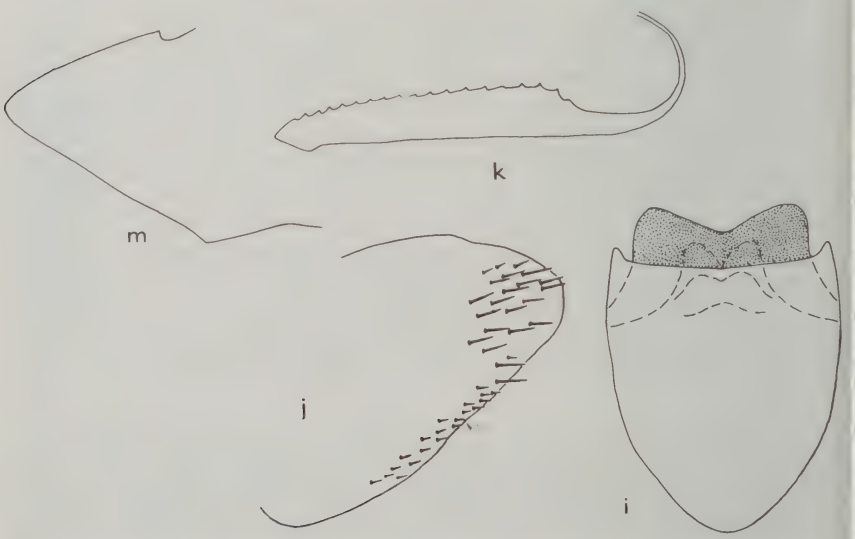
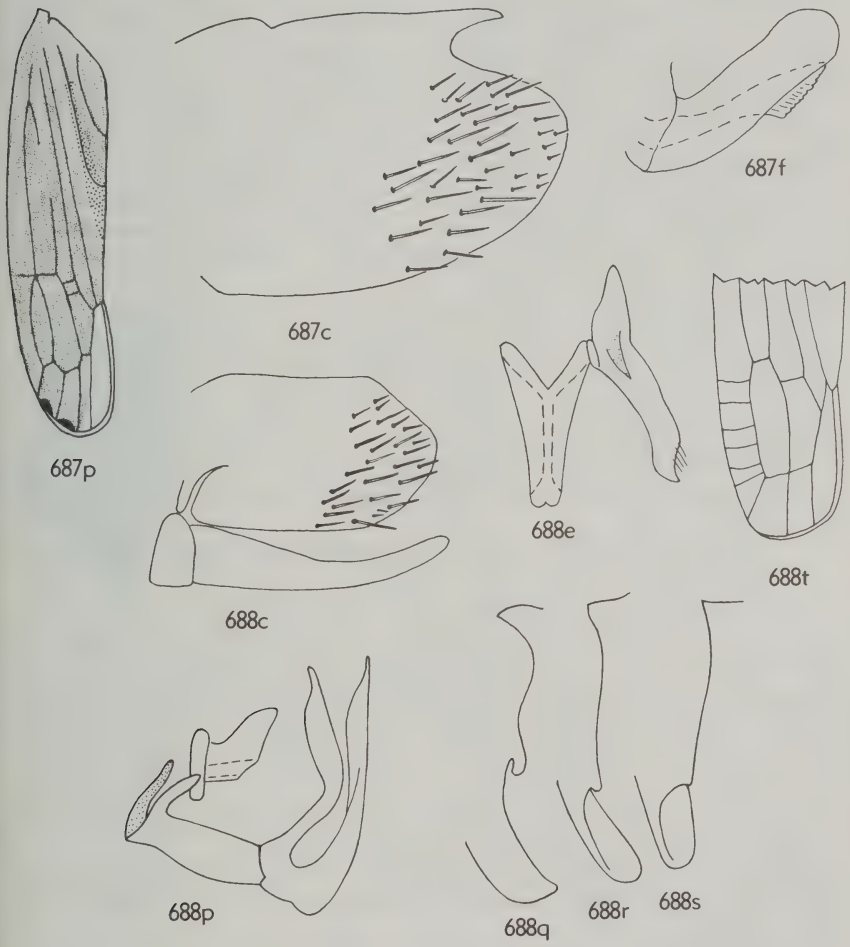


FIGURE 686.—*Graphocephala coccinea* (Forster) (see also fig 685) (from specimen from Bar Harbor, Maine; membrane of genital chamber shown in *i* (stippled); denticles not shown in *k* and *m*).

studied by earlier workers. I have not seen a type of *coccinea* and it seems doubtful if one exists. I have been unable to justify any further segregates on morphological grounds, although the amount of variation is great. Of the numerous varieties studied, specimens from the Cape Hatteras and Wilmington areas of North Carolina most nearly fit Forster's original description of *coccinea*. I follow a number of earlier writers in placing *Tettigonia quadrivittata*



FIGURES 687, 688.—687, *Graphocephala fennahi*, n. sp. (from specimen from Swannanoa, North Carolina; only aedeagal shaft shown in *f;* plate not shown in *c*): *p*, Forewing. Closely stippled areas are green; sparsely stippled areas are red. 688, *G. versuta* (Say) (*c* from specimen from Saluda County, South Carolina; *p* from Patuxent, Maryland; *q* from Lauderdale County, Tennessee; *s* from Marion County, Florida; *e*, *r*, *t*, from Raleigh, North Carolina): *p*, Aedeagus and paraphyses, from lateral view; *q-s*, male pygofer, left side, from dorsal view; *t*, forewing.

Say in synonymy under *coccinea*, an action that comports with the original description. I follow earlier workers in placing *Tettigonia teliformis* Walker and *Tettigonia picta* Walker in synonymy with *coccinea* as a result of my examination of the lectotype and holotype respectively, of these nominal species. Fowler's *Tettigonia idonea* is one of several color varieties in Central America. It grades into the commoner varieties of *coccinea*, as shown by a series in the USNM. Olsen discussed three color varieties of "*Proconia sambuci*", which were labeled in the Fitch collection, but *nomina nuda* until he briefly described them (1918b:120). They were *sambuci, confluenta,* and *punctata.* I have seen three specimens each bearing one of the above names, and each bearing a label: "Fitch's Collection". They are in the USNM and were doubtless the basis of Oman's (1949a:70) listing them in synonymy under *coccinea.* I agree with this disposition. I select now, as lectotype of *Tettigonia parabolica* Taschenberg, a male specimen from Martin Luther University collection in Halle an der Salle. It is without a label, but a closely associated label (with no specimen) on a pin states: "parabolica/m/[illegible word]". Another specimen in the type-series bore the label, "Illinois".

The present interpretation of *Proconia confluens* Uhler is based on a male "cotype" specimen in the USNM. It is presently designated as lectotype. It bears labels: "Proconia/confluenta/Dr. Kenrly Uhler/N.W. Bound. Surv." and "PR Uhler/Collection." It is conspecific with a number of other specimens in the USNM determined as *confluens.* I follow DeLong and Severin and their original illustration in keeping *Neokolla confluens* var. *pacifica* as a synonym of *confluens.* I examined the type of *Keonolla confluens* ssp. *surcula* DeLong and Currie.

My interpretation of *Tettigonia consobrina* Fowler is based on an examination of the male lectotype in the British Museum.

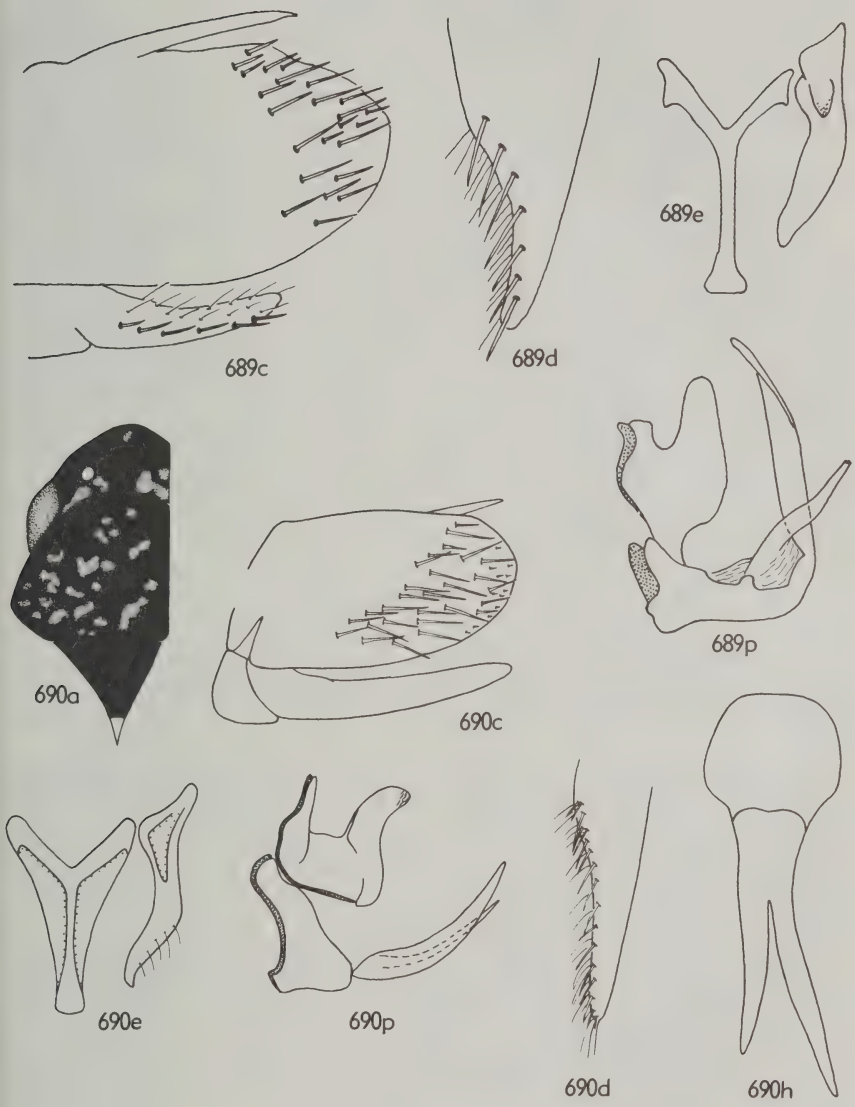
I have studied the type of *Keonolla curta* DeLong and Currie, but did not illustrate it because the original illustration is sufficient. The male pygofer is like the illustration of *G. spinosa* (DeLong and Currie) (fig. 701*c*) in shape, and the pygofer process is almost straight, as in *spinosa.* The male plates are about the same length, relative to the pygofer, as in *spinosa*, but are more narrowed apically, and with larger macrosetae in a single row. The aedeagal shaft differs in form from that of *spinosa.*

I have not seen the type of *Tettigonia cythura* Baker, and my identification of this species is based on labeled specimens in the USNM.

My interpretation of *Poeciloscarta distanti* Metcalf is based on a study of the female lectotype of *Tettigonia scutellata* Distant in the BM and a dissection of a male I compared with it there.

My interpretation of the male of *Tettigonia dohrni* Signoret is based on a male specimen compared with a drawing of the anterior dorsum of the female lectotype. It is very close to and may be identical to *Keonolla gemella* DeLong and Currie.

My interpretation of *Tettigonia edwardsi* Signoret is based on the female lectotype in MHNP, which I compared with my illustrations of the female lectotype of *Tettigonia magica* Stål (RMS). I have compared Schröder's type of *Tettigella salvadorensis*, a male, with the genitalia illustrations published here.



FIGURES 689, 690.—689. *Graphocephala aurolineata* (Fowler) (from specimen from Morelos, Mexico): *p*, Aedeagus and paraphyses, from lateral view. 690, *G. soluna*, n. sp., holotype (*h* from caudoventral view): *p*, Aedeagus and paraphyses, from lateral view.

Of two Mexican specimens of *Tettigonia multicolor* Signoret in NMV, one had the head missing, the other had the abdomen missing. I did not select a lectotype. I compared the head of the second specimen with the present illustration (fig. 713*a*) of *Graphocephala flavovittata* Metcalf.

The male holotype of *Keonolla gemella* DeLong and Currie was destroyed, except for the genitalia, in shipping. The genitalia are as in the original description and illustration. I have also examined the male paratype, from which the illustration (fig. 702*a*) of the anterior dorsum was made.

A male specimen of *Tettigonia guerreroensis* Fowler, compared with the female lectotype has genitalia like figure 718 in the present work.

As pointed out above, there is no type for *Tettigonia hieroglyphica* Say, and the original description is nearly worthless, Signoret (1858a:xxxii) synonymized it with his own *Tettigonia gothica*. The specimen Ball (1901e: pl. III, fig. 1) illustrated as *hieroglyphica* was compatible with Signoret's action. The paler varieties of *hieroglyphica* have the median anchor-shaped marking on the crown always extending laterally along the basal margin. A male specimen from Iowa determined as *hieroglyphica* by Ball in the USNM agrees closely with the figure cited above. The genitalia of this specimen are like those of the lectotype of *Tettigonia hieroglyphica* var. *dolobrata* Ball. Some of the darker varieties of *hieroglyphica* have the pale anchor-shaped coronal marking (expanded at basal margin as described above) and some do not, appearing like Ball's 1901e: pl. III, fig. 2 illustration. These intergrade in color. There is some intraspecific variation in the degree to which the male paraphyses are expanded anteapically (fig. 724) and this has led to some confusion in the past, I think. I have studied the lectotype of *Tettigonia lugubris* Signoret and it is like the variety of *hieroglyphica* illustrated here (fig. 724*a*). I have studied the lectotype of *Tettigonia gothica* Signoret (see p. 827 of present paper), the lectotype of *Tettigonia separanda* Fowler, and the lectotype of *Tettigonia amulae* Fowler.

The present identification of *Graphocephala ignava* Ball is based on specimens in the USNM bearing label "D. ignava nov." in Ball's handwriting. Fowler's *Tettigonia ignobilis* is known to me only from the type-series.

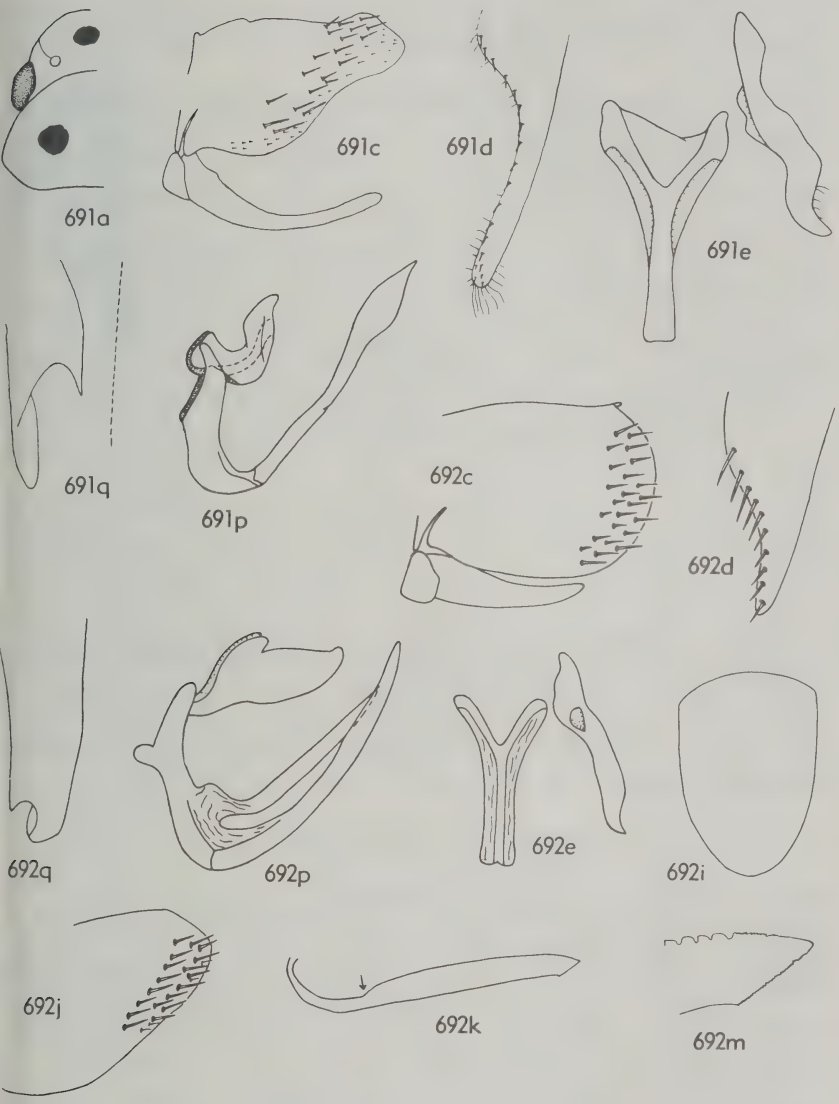
I examined the lectotype of *Tettigonia lemniscata* Fowler, a female, but failed to compare it with typical specimens of *T. aurolineata* Fowler which it closely resembles and with which it may be synonymous.

I did not see the type-specimen(s) of *Tettigonia lucasi* Signoret, from Guatemala. The original description says the specimen(s) were from the museum in Paris. There are two specimens from Mexico in the NMV. My interpretation of *Neokolla lurida* DeLong and Currie is based on the holotype.

The holotype of *Keonolla minuenda* DeLong and Currie is a pale variety of which some specimens grade into the very distinctive variety illustrated here (fig. 727*a*).

I have examined holotypes of *Tettigonia nigrifascia* Walker and of each of the nominal species listed in synonymy under it in the list of species, below.

My interpretation of *Tettigonia pectoralis* Fowler is based on an examination of female lectotype (fig. 698) and a study of males subsequently associated with the illustration of the lectotype.



FIGURES 691, 692.—691, *Graphocephala distanti* (Metcalf) (from specimen from Panama): *p*, Aedeagus and paraphyses, from lateral view; *q*, pygofer apex, left side, from dorsal view. 692, *G. punctulata* (Signoret) (*i-k, m,* from specimen from Vera Cruz, Mexico; remainder from Bilimek, Mexico; arrow indicates position of basalmost teeth in *k*): *p*, Aedeagus and paraphyses, from lateral view; *q*, male pygofer apex, right side, from dorsal view.

I have seen the female lectotype and one additional female of *Tettigonia pumicata* Fowler.

My interpretation of *Tettigonia punctulata* Signoret is based on a male specimen from NMV (fig. 692) I compared with the lectotype (without abdomen) there.

The female lectotype of *Tettigonia redacta* Fowler agrees well with the original description and illustration. I do not think it is a synonym of *versuta* (Say), as Ball (1901b:65) and other later authors placed it. I am not certain that the male I have determined as *redacta* is actually that species, but it is very close, and like the lectotype, it occurs in Panama.

The holotype of *Tettigonia rufimargo* Walker and the lectotype of its variety *propior* Fowler are both females, and I have examined both of them.

Keonolla spinosa DeLong and Currie is known to me only from the male holotype from Río Frio, D. F., Mexico. I have studied the lectotype and additional specimens of *Tettigonia teres* Fowler. *Keonolla torqua* DeLong and Currie is known to me from the holotype and a series of additional specimens.

I have studied the holotypes of *Keonolla subrufa* DeLong and Currie and *K. subrufa* subspecies *signara* DeLong and Currie and agree they are probably conspecific.

My interpretation of *Tettigonia hieroglyphica* var. *uhleri* Ball is based on an examination of the lectotype. I have not seen the types of *Cicadella inscripta* Olsen, *C. lutzi* Olsen, or *C. barberi* Olsen. I follow Oman in placing them under *uhleri*.

There is no type-specimen of *Tettigonia versuta* Say. In my interpretation, I follow many earlier authors who have applied the name to a common species of North America, a species which is markedly different from other species in the genus in the venation of the forewing in which the outer anteapical cell is absent and in which there are several supernumerary transverse veins from the middle anteapical cell to the costal margin.

SPECIES OF *GRAPHOCEPHALA*

alagarta, n. sp. Guatemala, Nicaragua, El Salvador.

albomaculata (Distant), 1879b:62 (*Tettigonia*). Costa Rica, Panama. New combination.

apicata, n. sp. Mexico: Nayarit, Guerrero, Morelos.

appropinquans (Fowler), 1899d:247 (*Tettigonia*). Mexico: Durango, Jalisco, Guanajuato, Vera Cruz, Puebla, D. F., Michoacán, Morelos. New combination.

atropunctata (Signoret), 1854b:354 (*Tettigonia*). U.S.A.: N. Mexico, Arizona, California; Mexico: S.L.P., Hidalgo, Vera Cruz, D.F., Michoacán; Nicaragua.

circellata (Baker), 1898c:285 (*Tettigonia*). New synonymy.

aurolineata (Fowler), 1900d:283 (*Tettigonia*). Mexico: Nayarit, Jalisco, Vera Cruz, Colima, Morelos, Chiapas, Guerrero; Guatemala; Costa Rica; Panama.

aurora (Baker), 1898c:286 (*Tettigonia*). U.S.A.: Arizona, Mexico: Vera Cruz, Colima, Michoacán, D.F., Morelos, Tlaxcala, Guerrero. New combination.

delicata (Fowler), 1900b:269 (*Tettigonia*). New synonymy.

cervina (Fowler), 1899e:250 (*Tettigonia*). Guatemala. New combination.

clepsydra (Fowler), 1900b:270 (*Tettigonia*). Mexico: Hidalgo; Honduras; Guatemala; Nicaragua; Costa Rica; Panama. New combination.

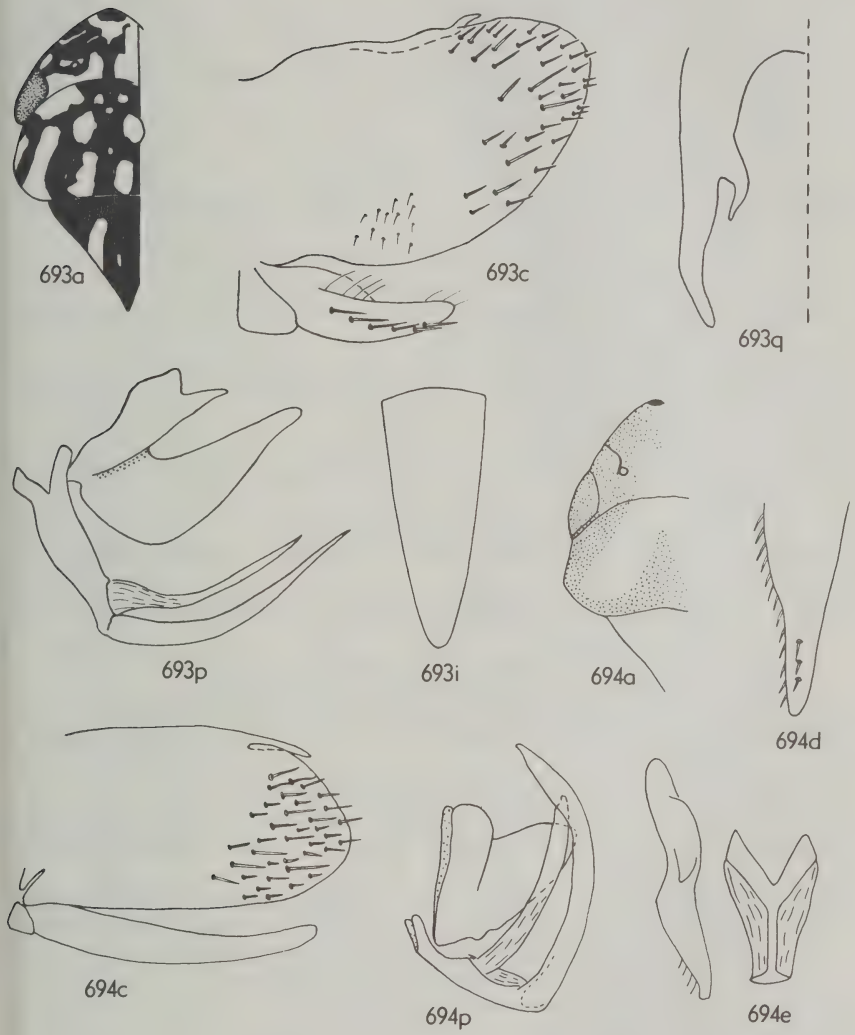


FIGURE 693, 694.—693, *Graphocephala edwardsi* (Signoret) (*a, i,* from lectotype of *Tettigonia magica* Stål; remainder from specimen from Vera Cruz, Mexico): *p,* Aedeagus and paraphyses, from lateral view; *q,* male pygofer, left side, from dorsal view. 694, *G. cervina* (Fowler) (from specimen from Solala, Guatemala): *p,* Aedeagus and paraphyses, from lateral view.

coccinea (Forster), 1771a:69 (*Cicada*). Canada: Ontario; U.S.A.: Maine to Florida and west to Kansas, also California; Mexico: Oaxaca; Honduras; Nicaragua; Costa Rica; Panama.

quadrivittata (Say), 1830b:312 (*Tettigonia*).

picta (Walker), 1851b:758 (*Tettigonia*).

teliformis (Walker), 1851b:764 (*Tettigonia*).

parabolica (Taschenberg), 1884a:450 (*Tettigonia*). New synonymy.

idonea (Fowler), 1900c:276 (*Tettigonia*).

sambuci (Olsen), 1918b:120 (*Proconia*).

punctata (Olsen), 1918b:120 (*Proconia sambuci* var.).

confluenta (Olsen), 1918b:120 (*Proconia sambuci* var.).

confluens (Uhler), 1861b:285 (*Proconia*). U.S.A.: California, Washington, Oregon; Canada: Vancouver. New combination.

pacifica (DeLong and Severin), 1949a:177 (*Neokolla confluens* var.).

surcula (DeLong and Currie), 1960a:2 (*Keonolla confluens* ssp.).

consobrina (Fowler) complex, 1899d:245 (*Tettigonia*). Mexico: D.F., Michoacán, Morelos; Guatemala. New combination.

curta (DeLong and Currie), 1960a:8 (*Keonolla*). Mexico. New combination.

cythura (Baker), 1898c:286 (*Tettigonia*). U.S.A.: Arizona, California. New combination.

delongi, n. sp. Mexico: Guerrero.

depicta, n. sp. Mexico: Morelos, D.F.

distanti (Metcalf), 1965a:64 (*Poecilloscarta*) (new name) Costa Rica, Panama. New combination.

scutellata (Distant), 1879b:62 (*Tettigonia*) (preoccupied).

dohrni (Signoret), 1855d:792 (*Tettigonia*). Mexico: Michoacán, Tlaxcala, Guerrero. New combination.

edwardsi (Signoret), 1855d:780 (*Tettigonia*). Mexico, Guatemala, El Salvador, Costa Rica. New combination.

magica (Stål), 1864a:77 (*Tettigonia*). New synonymy.

salvadorensis (Schröder), 1959a:67 (*Tettigella*). New synonymy.

fennahi, n. sp. U.S.A.: Virginia, North Carolina, Georgia, Oregon; England.

flavovittata Metcalf, 1955a:265 (new name). Mexico: Vera Cruz, Michoacán, Morelos; Panama Canal Zone.

multicolor (Signoret), 1853b:363 (*Tettigonia*) (preoccupied).

gemella (DeLong and Currie), 1960a:9 (*Keonolla*). Mexico: Morelos. New combination.

guerreroensis (Fowler), 1899d:246 (*Tettigonia*). Mexico: Michoacán, Morelos, Guerrero. New combination.

hieroglyphica (Say), 1830b:313 (*Tettigonia*). U.S.A.: Iowa, Michigan, Arkansas, Georgia, Missouri, Kansas, Nebraska, Texas, Wisconsin, Colorado, New Mexico, Arizona; Mexico: Zacatecas, Hidalgo, D.F. New combination.

lugubris (Signoret), 1854a:13 (*Tettigonia*). New synonymy.

dolobrata (Ball), 1901b:52 (*Tettigonia hieroglyphica*, var.).

separanda (Fowler), 1899e:249 (*Tettigonia*). New synonymy.

amulae (Fowler), 1899e:252 (*Tettigonia*). New synonymy.

ignava Ball, 1936a:22. U.S.A.: Arizona; Mexico: Jalisco, Vera Cruz, Hidalgo, D.F., Morelos, Michoacán, Guerrero.

ignobilis (Fowler), 1899d:248 (*Tettigonia*). Mexico. New combination.

kukla, n. sp. El Salvador.

lemniscata (Fowler), 1900d:283 (*Tettigonia*). Mexico: Guerrero. New combination.

lucasi (Signoret), 1855d:778 (*Tettigonia*). Mexico, Guatemala, Honduras, El Salvador. New combination.

lurida (DeLong and Currie), 1959a:62 (*Neokolla*). Mexico: Guerrero. New combination.

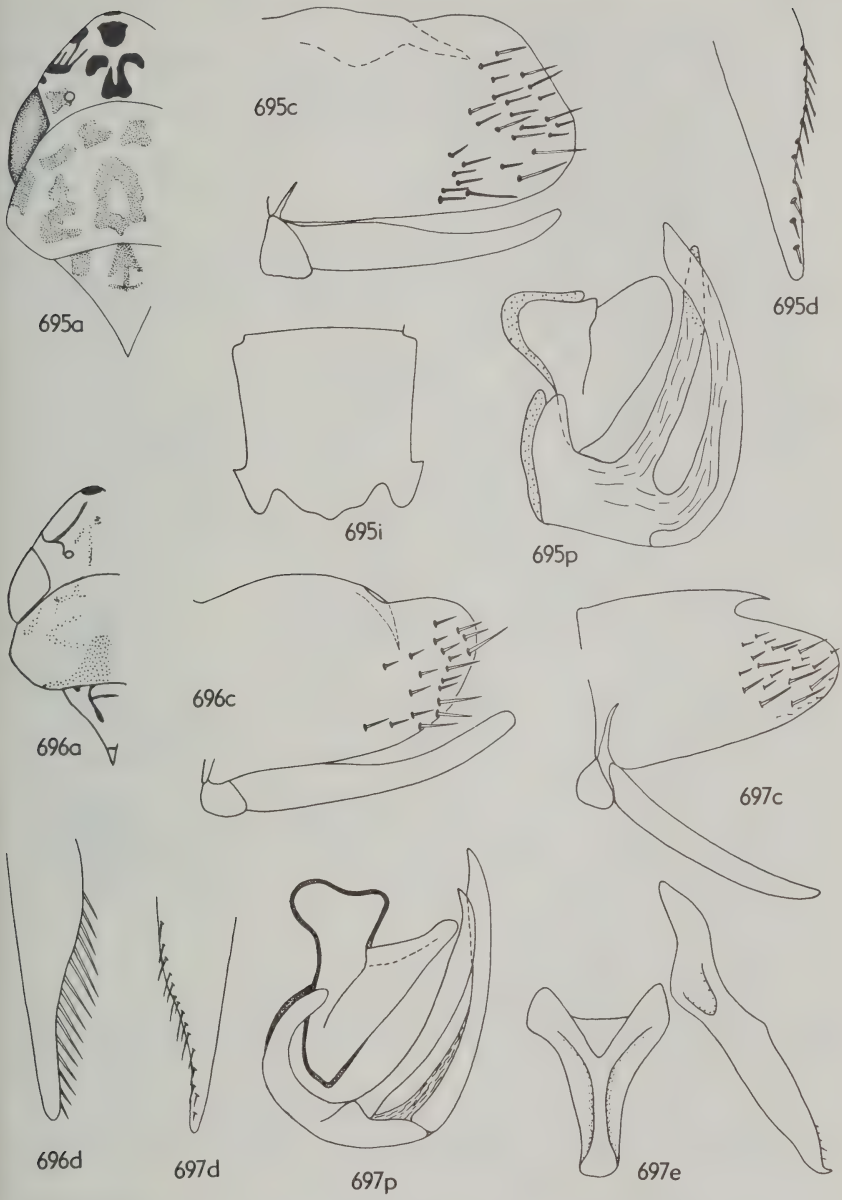


FIGURE 695-697.—695, *Graphocephala dohrni* (Signoret) (*a* from specimen from Taxco, Mexico; *i* from lectotype; remainder from Tuxpan, Mexico): *p*, Aedeagus and paraphyses, from lateral view. 696, *G. penignava*, n. sp., holotype. 697, *G. ignava* Ball (from specimen from Jacala, Mexico): *p*, Aedeagus and paraphyses, from lateral view.

marathonensis (Olsen), 1918a:3 (*Cicadella*). U.S.A.: Texas; Mexico; Guatemala; Costa Rica. New combination.

minuenda (DeLong and Currie), 1960a:9 (*Keonolla*). U.S.A: California, Arizona, New Mexico; Mexico: D.F., Guerrero. New combination.

nigrifascia (Walker), 1851b:776 (*Tettigonia*). Mexico, Colombia. New combination.

pallida (Walker), 1851b:776 (*Tettigonia*).

albida (Walker), 1851b:777 (*Tettigonia*).

uniguttata (Walker), 1851b:778 (*Tettigonia*).

candida (Walker), 1858b:195 (*Tettigonia*).

detrahens (Walker), 1858b:196 (*Tettigonia*). New synonymy.

albidissima (Metcalf), 1955a:264 (*Amblyscarta nigrifascia* var.). New synonymy.

pectoralis (Fowler), 1900d:285 (*Tettigonia*). Mexico: S.L.P. New combination.

penignava, n. sp. Mexico: D.F., Morelos.

psephena, n. sp. Mexico: Hidalgo, D.F.; Guatemala.

pulchra, n. sp. Mexico: Michoacán, Morelos, Guerrero, Oaxaca.

pumicata (Fowler), 1899d:246 (*Tettigonia*). Panama. New combination.

punctulata (Signoret), 1853b:345 (*Tettigonia*). Mexico. New combination.

redacta (Fowler), 1900c:276 (*Tettigonia*). Mexico: Nayarit; Guatemala; Costa Rica; Panama: Peña Blanca, Chiriquí; Venezuela; Fr. Guiana.

rufimargo (Walker), 1858b:197 (*Tettigonia*). Mexico: Sinaloa, S.L.P., Durango, Vera Cruz, Morelos, Puebla, Guerrero, Tabasco, Chiapas; Honduras; Br. Honduras; Guatemala; Costa Rica; Panama.

propior (Fowler), 1900d:284 (*Tettigonia rufimargo* var.).

sasaima, n. sp. Colombia: Cundinamarca, Magdalena.

simulata, n. sp. Mexico: Hidalgo, Vera Cruz, Michoacán, D.F., Puebla.

soluna, n. sp. Panama.

spinosa (DeLong and Currie), 1960a:12 (*Keonolla*). Mexico: D.F. New combination.

subrufa (DeLong and Currie), 1960a:6 (*Keonolla*). U.S.A.: New Mexico, Arizona; Mexico: Durango, Jalisco, D.F., Puebla, Tlaxcala, Michoacán, Morelos, Guerrero. New combination.

signara (DeLong and Currie), 1960a:7 (*Keonolla subrufa* subsp.).

teres (Fowler), 1900d:287 (*Tettigonia*). Mexico: Michoacán, D.F., Morelos, Guerrero.

torqua (DeLong and Currie), 1960a:7 (*Keonolla*). Mexico: D.F. New combination.

uhleri (Ball), 1901b:52 (*Tettigonia hieroglyphica* var.). U.S.A.: Washington, Colorado, New Mexico, Arizona; Mexico: Sonora, D.F. New combination.

barberi (Olsen), 1922a:361 (*Cicadella*).

inscripta (Olsen), 1922a:362 (*Cicadella*).

lutzi (Olsen), 1922a:360 (*Cicadella uhleri* ssp.).

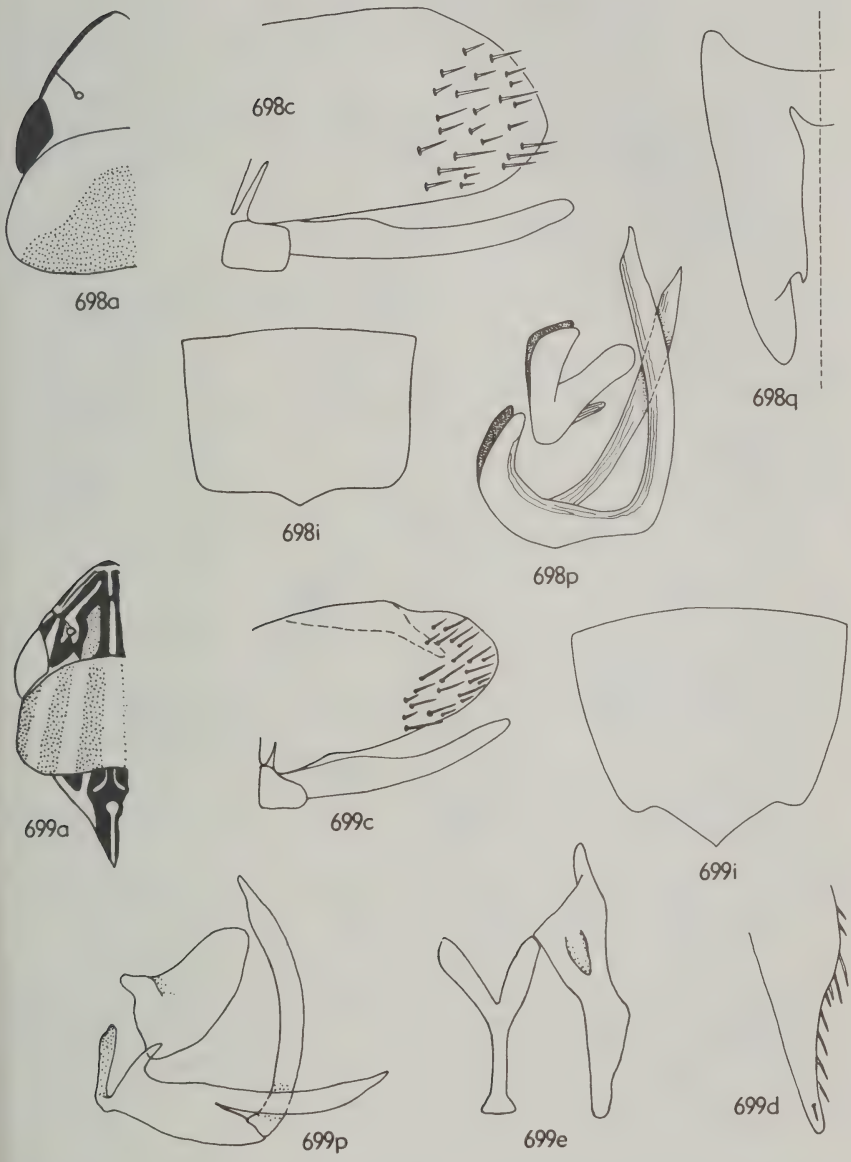
versuta (Say), 1830b:311 (*Tettigonia*). U.S.A.: Massachusetts to Florida Keys and West to Texas; Mexico: Nuevo Leone, S.L.P., Tamaulipas, Morelos; Costa Rica.

KEY TO MALES OF *GRAPHOCEPHALA*

(*G. lemniscata* (Fowler), *G. ignobilis* (Fowler), and *G. pumicata* (Fowler) not included)

1. Larger, length 5.8 mm or more *and* with a conspicuous marginal black stripe separating very pale crown from very pale face 2
   Shorter, *or* not marked as above 3

2. Pygofer without a dorsoapical projection
   coccinea (Forster) (fig. 685, 686)
   Pygofer with a dorsoapical projection ..... *fennahi*, n. sp., page 874



FIGURES 698, 699.—698, *Graphocephala pectoralis* (Fowler) (*a, i,* from lectotype; remainder from San Luis Potosí, Mexico): *p,* Aedeagus and paraphyses, from lateral view; *q,* male pygofer, left side, from dorsal view. 699, *G. pulchra,* n. sp. (*i* from Mexico; remainder from holotype): *p,* Aedeagus and paraphyses, from lateral view.

3. Forewing with outer anteapical cell usually wanting, with several supernumerary crossveins to costal margin opposite middle anteapical cell (fig. 688*t*); *and* with a median longitudinal pale stripe on crown *versuta* (Say) (fig. 688)

Forewing with outer anteapical cell distinct, or if rarely containing supernumerary crossveins to costal margin opposite outer anteapical cell (*appropinquans* (Fowler); *simulata*, n. sp.), then without median coronal pale stripe 4

4. Head with lenticular impressions on crown 5
Head without lenticular impressions on crown 43

5. Head with a distinct but weak carina at transition from crown to face *nigrifascia* (Walker) (fig. 710)

Head without such a carina 6

6. Pygofer with a dorsal process which may or may not be differentially sclerotized, but not consisting merely of the rolled-down edge of the pygofer 7
Pygofer without such a process 20

7. Plates not extending posteriorly nearly as far as pygofer apex 8
Plates extending posteriorly approximately as far as pygofer apex 12

8. Forewing with claval suture bordered with orange *aurolineata* (Fowler) (fig. 689)

Forewing without orange markings 9

9. Crown, pronotum, and scutellum yellow, with one spot each on crown and scutellum and a pair of spots on disk of pronotum, black *distanti* (Metcalf) (fig. 691)

Crown, pronotum, and scutellum not marked as above 10

10. Face black without yellow markings ..... *soluna*, n. sp., page 880
Face with conspicuous yellow markings 11

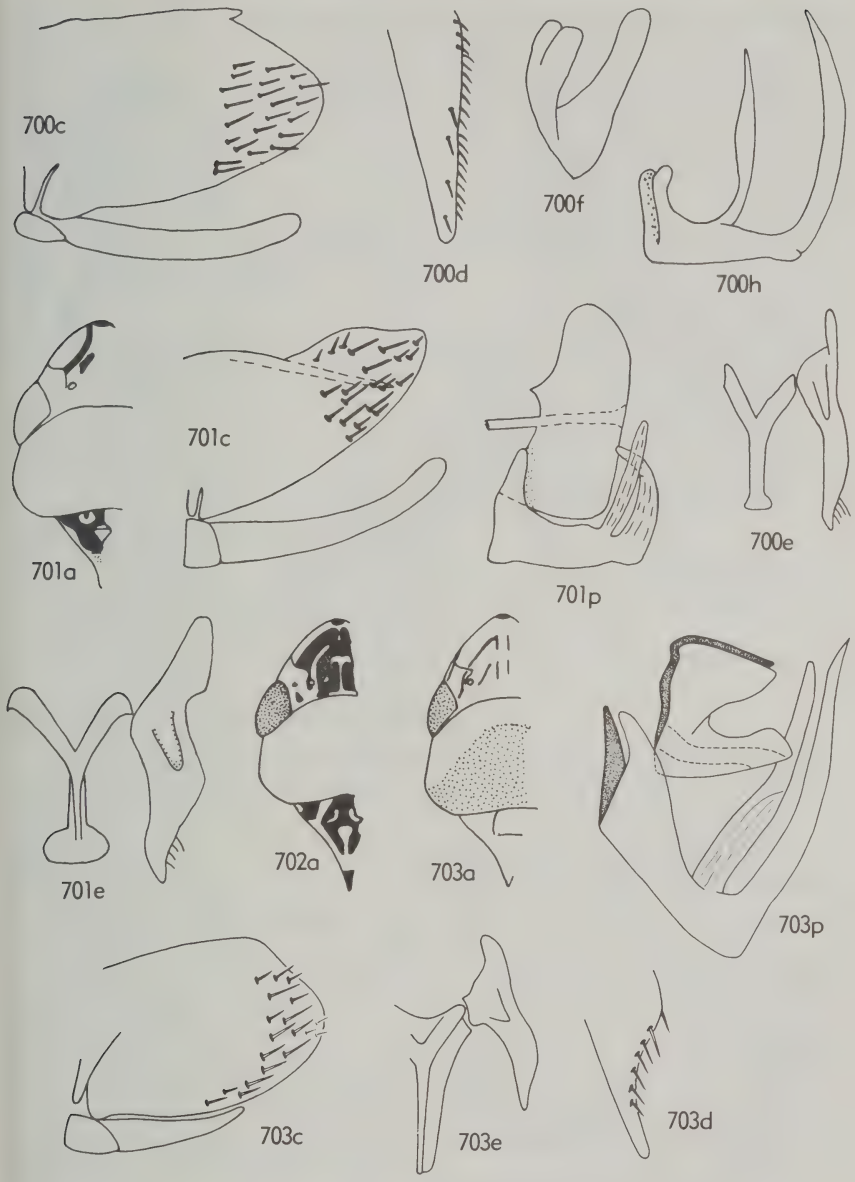
11. Clypeus black with numerous yellow dots and vermiculations, aedeagal shaft shorter (female abdominal sternum VII shorter, its length only slightly greater than the exposed portion of the ovipositor) *punctulata* (Signoret) (fig. 692)

Clypeus with yellow markings more extensive, aedeagal shaft longer (female abdominal sternum VII longer, its length much greater than exposed portion of ovipositor) ..... *edwardsi* (Signoret) (fig. 693)

12. Crown and pronotum brown, with a median spot on crown and a large bilobed spot on pronotum, cream-colored *cervina* (Fowler) (fig. 694)

Not so marked 13

13. Crown yellow with black spots several of which occur on the median line ..... *dohrni* (Signoret) (fig. 695)
Not so marked 14



FIGURES 700-703.—700, *Graphocephala subrufa* (DeLong and Currie), from specimen from Tucson, Arizona; *h* from lateral view). 701, *G. spinosa* (DeLong and Currie), holotype (pronotal mottling not shown in *a*): *p*, Aedeagus and paraphyses, from lateral view. 702, *G. gemella* (DeLong and Currie) (from specimen from Morelos, Mexico). 703, *G. apicata*, n. sp., holotype: *p*, Aedeagus and paraphyses, from lateral view.

14. Forewing with a commissural pale spot in apical half of clavus 15
Forewing without such a pale spot 16

15. Forewing with pale spot narrow and inconspicuous; male plates with setae elongate (fig. 696*d*) ..... *penignava*, n. sp., page 882
Forewing with pale spot usually visible without magnification; male plates with setae short ..... *ignava* Ball (fig. 697)

16. Crown with a median and two lateral narrow stripes, each edged in black forming a sagittate marking (fig. 699*a*)
pulchra, n. sp., page 883
Crown not so marked 17

17. Crown more acute apically (fig. 698*a*); face entirely black and with black extending dorsally to anterolateral margins of crown which appears dark margined in dorsal view ..... *pectoralis* (Fowler) (fig. 698)
Crown not as acute, color markings not as above 18

18. Pygofer process not differentially sclerotized, arising as a short prolongation at apex of dorsal pygofer margin on each side
subrufa (DeLong and Currie) (fig. 700)
Pygofer process differentially sclerotized, arising more basally 19

19. Aedeagus in lateral view appearing inflated throughout its length
spinosa (DeLong and Currie) (fig. 701)
Aedeagus in lateral view narrow in apical portion
curta (DeLong and Currie)
gemella (DeLong and Currie) (fig. 702)

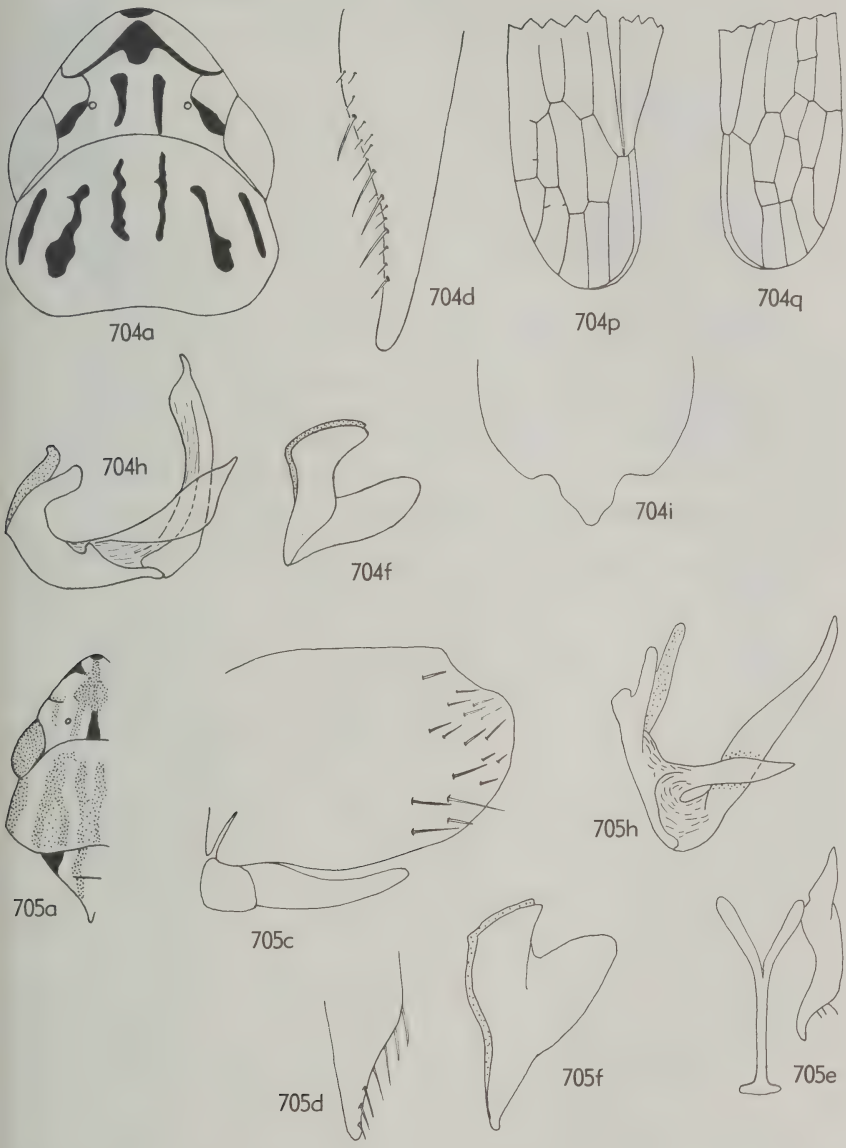
20. Plates not extending posteriorly nearly as far as pygofer apex 21
Plates extending posteriorly as far, or almost as far as pygofer apex 26

21. Apex of head with a conspicuous black spot 22
Apex of head without a black spot 23

22. Crown with a broad ivory submarginal line; face with only a median basal black spot ..... *apicata*, n. sp., page 887
Crown pale green with black markings; face with a median and two lateral black spots at base ..... *cythura* (Baker) (fig. 704)

23. Dorsum with a pale stripe on each side forming a conspicuous lenticular pattern beginning at anterior pronotal margin behind inner eye margins, extending across humeral pronotal margin on each side and posteriorly along claval suture to claval apex (additional markings present) ..... *delongi*, n. sp., page 889
Dorsum without such a pale marking 24

24. Dorsum brown with scutellum and a large diamond-shaped transcommissural marking across apical half of clavus paler
teres (Fowler) (fig. 706)
Dorsum not as above 25



FIGURES 704, 705.—704, *Graphocephala cythura* (Baker) (*i, p, q,* from specimen from Yarnell Heights, Arizona; remainder from Huachuca Mountains, Arizona; *h* from lateral view): *p, q,* Left and right forewing, respectively. 705, *G. delongi,* n. sp., holotype (*h* from lateral view).

25. Dorsum brown with numerous small pale dots and vermiculations *consobrina* (Fowler) complex (figs. 707, 708)
    Dorsum green to olive yellow with black markings on crown and scutellum 44
26. Styles extending posteriorly well beyond apex of connective (figs. 709*e* and 712*e*) 27
    Styles not or extending posteriorly only slightly beyond apex of connective 29
27. Paraphyses with rami both reduced (fig. 709*p*); aedeagus slender, elongate, in caudoventral view with apex slightly widened then truncate *simulata*, n. sp., page 891
    Paraphyses with one ramus longer than aedeagal shaft, more basal ramus reduced or not; aedeagal shaft shorter, not as above 28
28. Crown broadly rounded anteriorly; pronotal width less than or equal to transocular width of head ..... *marathonensis* (Olsen) (fig. 711)
    Crown bluntly triangular; pronotal width greater than transocular width of head ..... *appropinquans* (Fowler) (fig. 712)
29. Crown with a conspicuous transverse black stripe behind apex *flavovittata* Metcalf (fig. 713)
    Crown not so marked 30

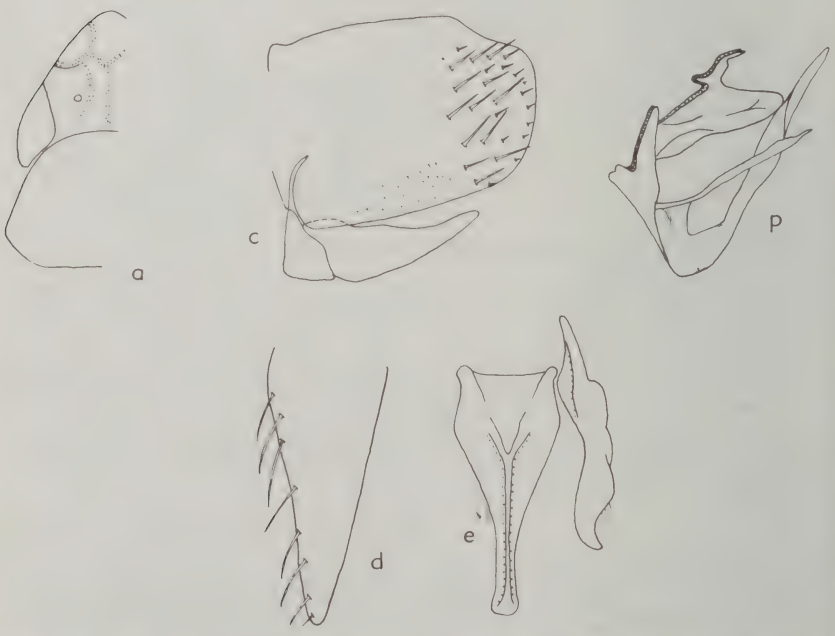


FIGURE 706.—*Graphocephala teres* (Fowler) (from specimen from Cuernavaca, Mexico) (background of yellow strongly mottled with brown not represented in *a*): *p*, Aedeagus and paraphyses, from lateral view.

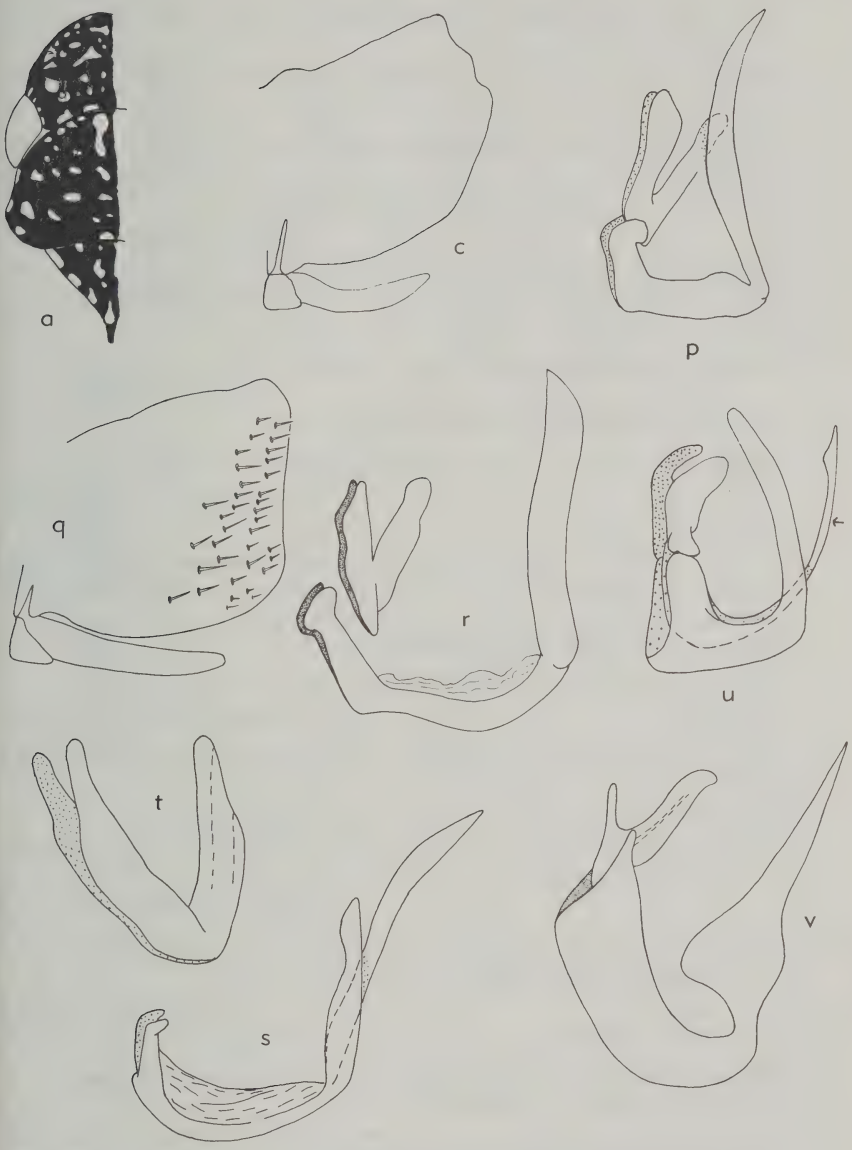


FIGURE 707.—*Graphocephala* spp., *consobrina* (Fowler) complex (*a, c, p,* from specimen from Tuxpan, Mexico; *q, r,* from Patzun, Guatemala; *s, t,* from Necaxa, Pueblo, Mexico; *u* from Morelos, Mexico; *v* from Mexico; setae not shown in *c*): *p, r, u, v,* Aedeagus and paraphyses, from lateral view (arrow points to aedeagal shaft in *u*): *q,* male pygofer and plate, from lateral view; *s,* paraphyses from lateral view; *t,* aedeagus from lateral view.

30. Crown with a median triangular area, or two broad converging vittae, extending from posterior margin to apex, brown or black, median line narrowly pale or not 31
Crown without dark area as described above (may be more extensively dark) 32

31. Basal portion of face with median apical and two lateral spots near apex, black ..... *depicta*, n. sp., page 893
Basal portion of face with only median black spot
clepsydra (Fowler) (fig. 715)

32. Crown entirely black except a few inconspicuous pale markings at posterior margin ..... *albomaculata* (Distant) (fig. 716)
Crown not so marked 33

33. Paraphyses consisting of basal piece and one ramus
aurora (Baker) (fig. 717)
Paraphyses consisting of basal piece and two rami 34

34. Length more than 7.5 mm (to apex of forewings in rest position)
guerreroensis (Fowler) (fig. 718)
Length less than 7.0 mm 35

35. Scutellum yellow or orange-yellow or greenish, without black markings other than transverse sulcus, or if so then only at base (*atropunctata* (Signoret)) and then partly concealed by pronotum 36
Scutellum with black markings more extensive 38

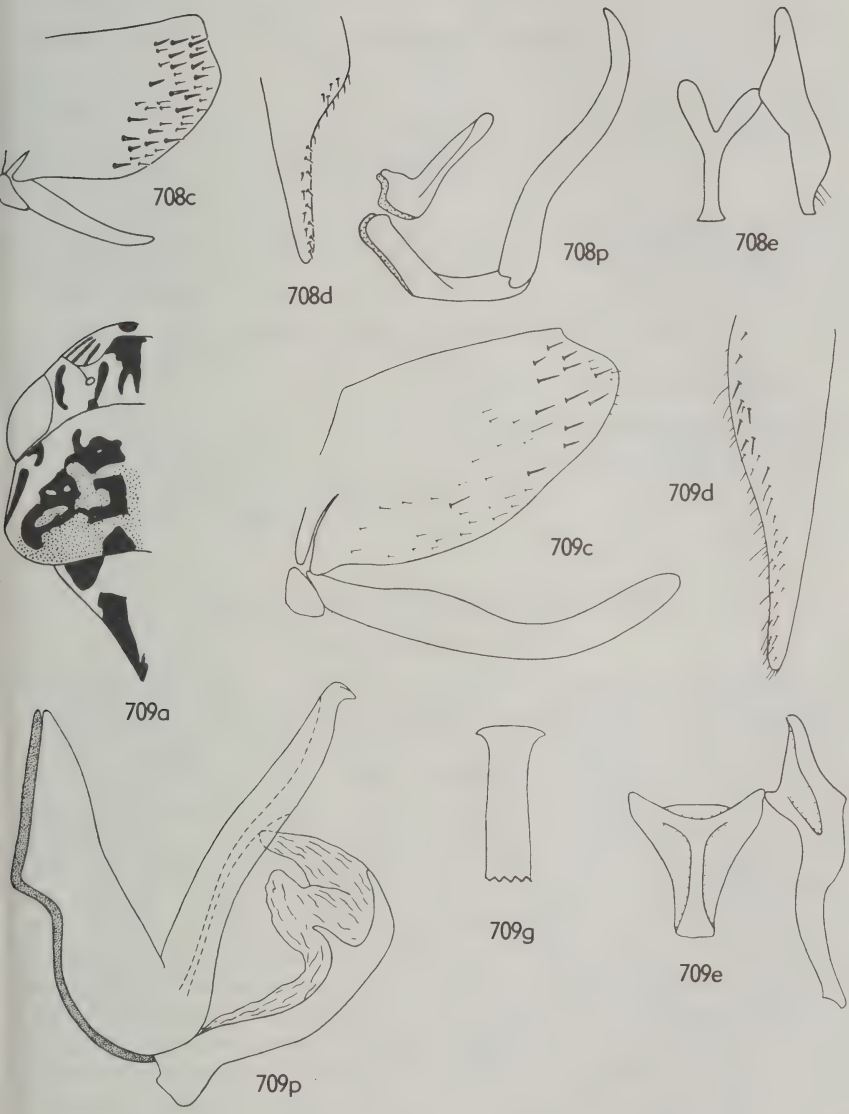
36. Face pale except median basal spot; forewings with claval suture usually blue ..... *rufimargo* (Walker) (fig. 719)
Face dark, or with dark markings; forewings with claval suture not blue 37

37. Face entirely black (male) or with clypellus pale (female)
alagarta, n. sp., page 895
Face with clypellus pale, with a median black mark
atropunctata (Signoret) (fig. 721)

38. Crown with a twice-branched narrow linear black pattern medially and a submarginal black line on each side (fig. 722*a*)
kukla, n. sp., page 897
Crown not so marked 39

39. Head slender, more produced (fig. 723*a*); style not extending posteriorly as far as apex of connective
torqua (DeLong and Currie) (fig. 723)
Head broader; style extending posteriorly as far as apex of connective 40

40. Black with a slender median coronal stripe and a broader median scutellar band, pale ..... *hieroglyphica* (Say) (fig. 724)
Not black, paler markings much more extensive 41



FIGURES 708, 709—708, *Graphocephala consobrina* (Fowler), lectotype: *p*, Aedeagus and paraphyses, from lateral view. 709, *G. simulata*, n. sp., holotype (only apical portion of aedeagal shaft shown in *g*): *p*, Aedeagus and paraphyses, from lateral view.

41. Crown with a pale median marking that has two lateral branches near center of disk, and two at base, extending narrowly along posterior margin ..... *hieroglyphica* (Say) (fig. 724)
Crown often pale medially, but without the narrow lateral posterior branches 42

42. Length 6.0 mm or more ..... *confluens* (Uhler) (fig. 725)
Length 5.5 mm or less ..... *uhleri* (Ball) (fig. 726)
minuenda (DeLong and Currie) (fig. 727)
lurida (DeLong and Currie) (fig. 728)

43. Crown marked with black lines; paraphyses with two rami 44
Crown without black lines; paraphyses with a single apical portion (fig. 729*p*) ..... *lucasi* (Signoret) (fig. 729)

44. Aedeagus with a pair of short, acute apical processes (fig. 730*p*) in ventral view ..... *sasaima*, n. sp., page 885
Aedeagus without such processes 45

45. Crown with a pale area parallel to anterolateral and anterior margin, dark markings regular ..... *redacta* (Fowler) (fig. 731)
Crown without such an area, dark markings irregular (fig. 732*a*)
psephena, n. sp., page 889

Graphocephala fennahi, NEW SPECIES

FIGURE 687, PAGE 855

Length of male 7.8-8.3 mm, of female 8.6-9.1 mm. Head well produced, median length of crown varying from almost seven-tenths to slightly more than eight-tenths interocular width and from slightly less than five-tenths to slightly less than six-tenths transocular width, ocelli located on a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown, surface not punctate near apex nor on disk; antennal ledges with anterior margins vertical and convex in lateral view; face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus with muscle impressions not very distinct. Thorax with pronotal width greater than transocular width of head, lateral pronotal margins convergent anteriorly, disk not transversely rugulose; scutellum not transversely rugose behind transverse sulcus; forewing with veins not very distinct except at apex, outer anteapical cell with supernumerary crossveins in some specimens, hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer moderately produced, with an apical dorsal acute process extending posteriorly, separated from convex remainder of posterior pygofer margin by a distinct concavity; plates not extending nearly as far posteriorly as pygofer apex, each with uniseriate macrosetae; style not extending posteriorly nearly as far as apex of connective; aedeagal shaft short, without processes, dorsal apodemes conspicuous; paraphyses consisting of a basis and two rami which are fairly similar in length, extending anterodorsally in lateral view. Female abdominal sternum

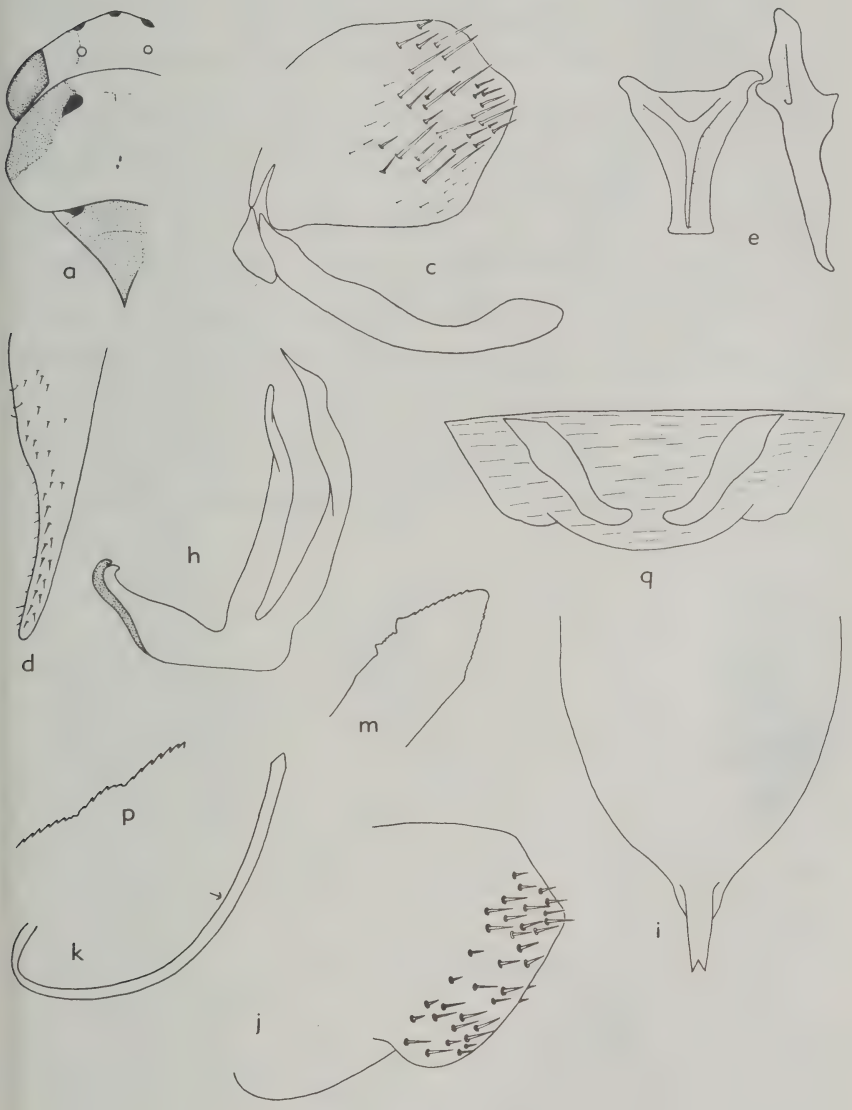


FIGURE 710.—*Graphocephala nigrifascia* (Walker) (*c-e*, from specimen from Colima, Mexico; *a*, *h*, from Temescaltepec, Mexico; remainder from Mexico; *h* from lateral view; arrow in *k* indicates beginning of toothed area): *p*, Teeth near arrow of *i*, *q*, dorsal membrane of genital chamber, with sclerites.

VII strongly produced and rounded apically; ovipositor with slanting primary teeth on dorsal margin of second valvulae, each with minute secondary teeth, primaries progressively more closely spaced apically, apex narrowly rounded and with anteapical posterodorsal and posteroventral minute denticles; pygofer with setae arranged irregularly from apex anteroventrally parallel to posteroventral margin.

Head in dorsal view with anterior margin narrowly black, disk greenish-yellow; pronotum with broad anterior marginal stripe concolorous with disk of crown, remainder dark green, occasionally with an orange spot on each side of anterior pronotal band and/or on green portion; scutellum dull orange, unmarked; forewing with a costal marginal band concolorous with crown and anterior band on pronotum, remainder dark green and concolorous with major portion of pronotum, with at least a dull orange claval stripe parallel to claval suture and reaching commissural margin apically, and at most a second narrower orange stripe parallel to brachial cell and extending through inner anteapical and second apical cells to wing apex, appendix, inner apical cell and an apical spot in apical cells 2, 3, and 4, smoky; face with dorsal margin black, with a black line bordering each pronotal dorsopleural carina ventrally, remainder of face, thoracic pleura, venter, and legs pale yellow. The outermost orange stripe of the forewing may be reduced basally to a variable degree.

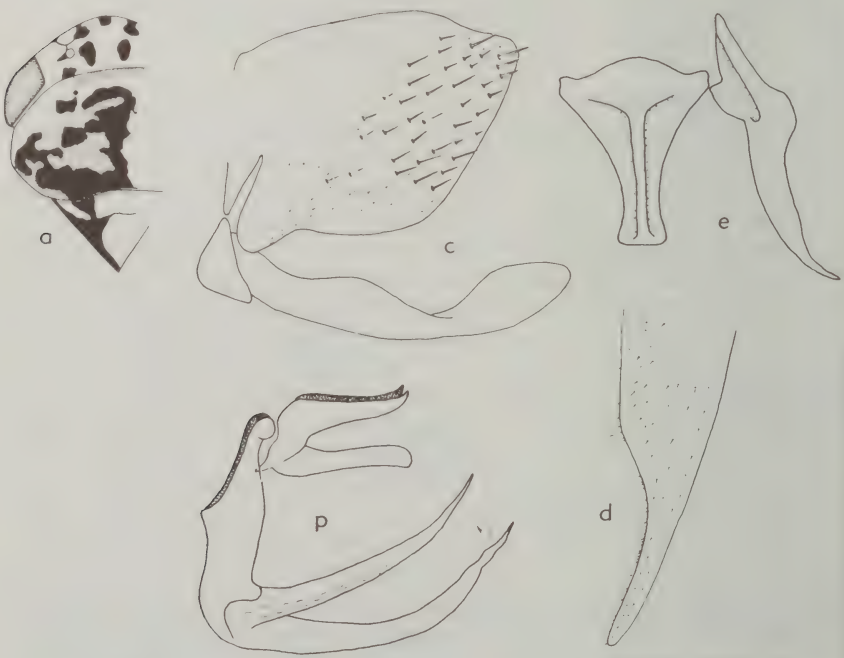


FIGURE 711.—*Graphocephala marathonensis* (Olsen) (from specimen from Mexico): *p*, Aedeagus and parphyses, from lateral view.

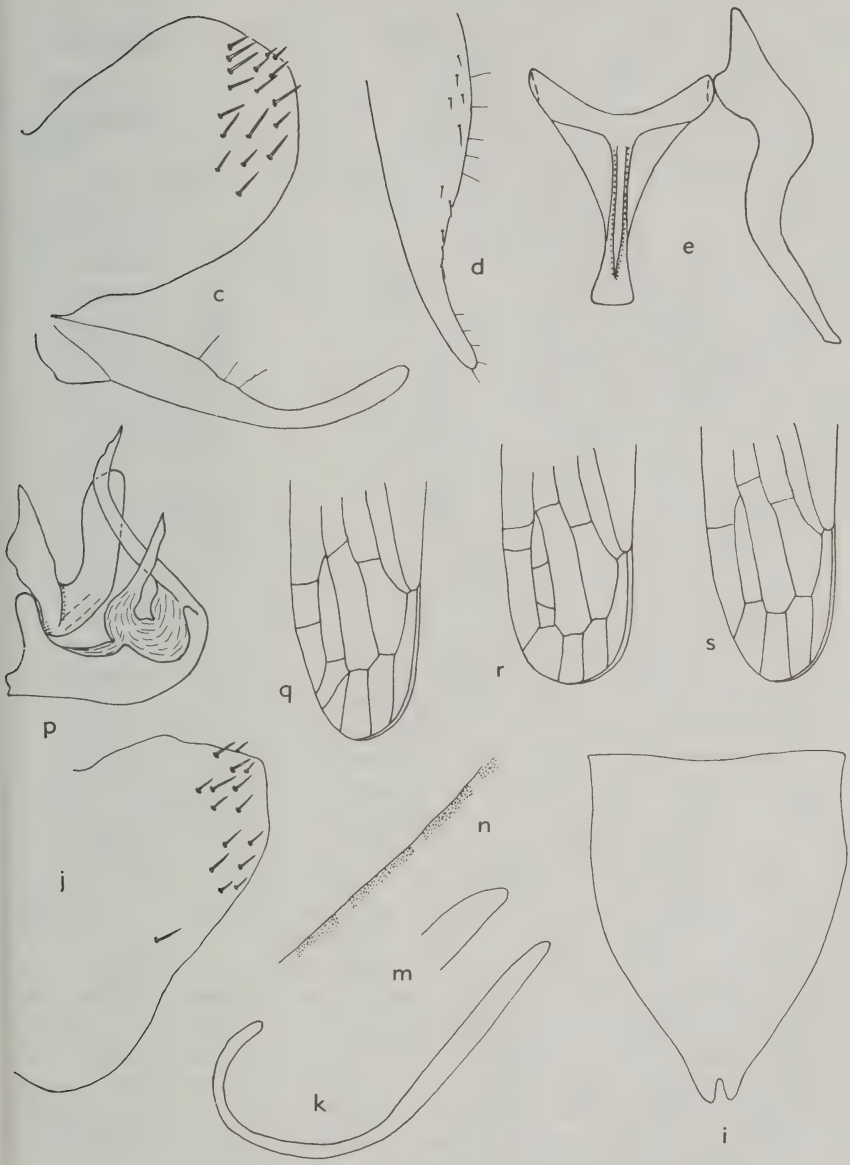
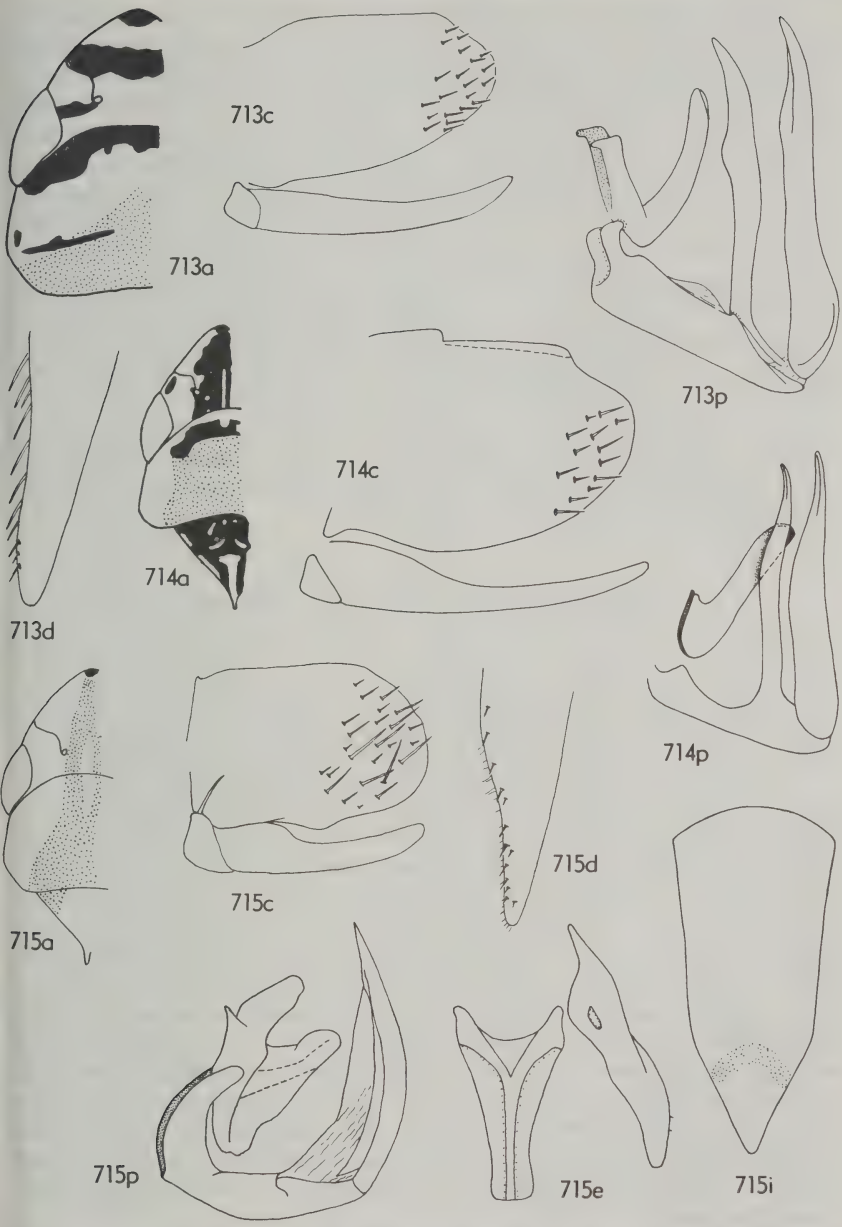


FIGURE 712.—*Graphocephala appropinquans* (Fowler) (*i-k, m, n,* from specimen from Mexico City; *q, s,* from specimens from Guadalajara, Mexico; *r* from Puebla, Mexico; remainder from Michoacán, Mexico): *p,* Aedeagus and paraphyses, from lateral view; *q-s,* apex of forewing; *n,* dorsal margin of second valvula at midlength.

Holotype male and three females, Crabtree Meadows Park, North Carolina, July 29, 1958 (David A. Young); six males, Mt. Pisgah, North Carolina, July 17, 1958 (D. A. Young); one specimen, Mt. Pisgah, N. C., July 18, 1959 (D. A. Young); two specimens, same data except July 19, 1958; two specimens same data except August 15, 1959; one specimen, Daughton Park, N. C., July 24, 1958 (W. M. Kulash); one specimen, Mt. Mitchell State Park, N. C., July 22, 1958 (W. M. Kulash); twenty-five specimens, including both sexes, Haywood Co., N. C., July 20, 1958 (D. A. Young); twenty specimens representing both sexes, Mt. Pisgah, N. C., August 8, 1957 (Dale Habeck); four specimens, Robbinsville, N. C., July 24, 1958 (D. A. Young); four specimens, Transylvania Co., N. C., August 14, 1957 (David A. Young); four specimens, Highlands, N. C., July 23, 1958 (T. B. Mitchell) (one labeled "Rhododendron"); one male, Blue Ridge Parkway near Roaring Gap, N. C., July 1, 1941 (T. B. Mitchell); one male, Black Mts., N. C., about 5000 ft., (R. W. Leiby), July 18, 1919; four specimens, Rabun Bald, Georgia, July 27, 1941 (P. W. Fattig); one specimen, Crabtree Meadows Park, N. C., July 5, 1970 (F. M. Stiner) on Rhododendron (all NCS). Thirty-five specimens, Fancy Gap, Carroll Co., Virginia, August 1, 1959 (F. W. Mead) some labeled "at Rhododendron", some "Rhododendron maximum" (SPBF). Eighteen specimens on points and four additional capsules of specimens, Daughton Park, N. C., September 9, 1952 (B. D. Burks); seven specimens, Linville, N. C., August 9, 1937 (C. E. Burt), "on fern"; one male, Highlands, N. C., September 8, 1906 (R. S. Woglum); eighteen specimens, Esher, Surrey, England, August 24, 1947 (J. F. G. Clarke) "off cornus"; two specimens, same locality as preceding, August 9, 1947 (J. F. G. Clarke); three specimens, same data as preceding except August 15, 1947 and collectors (two specimens, Mrs. J. F. G. Clarke, and one specimen, Carol Clarke); two specimens, same locality, August 20, 1947 (J. F. G. Clarke); six specimens, same locality (J. F. G. Clarke), one September 3, 1947, one September 14, 1947, four September 16, 1947; one female, Lyndhurst, Hampshire, England, September, 1960 (N. L. H. Krauss) (all USNM). Seven specimens, Rabun Bald, Ga., August 9, 1957 (L. A. Kelton) (CNC). Three specimens, Whitesides Mts., N. C., August 6, 1951 (E. C. Zimmerman); two specimens, Highlands, N. C., August, 1951, one without collector label, one E. C. Zimmerman; one specimen, same locality, August 7, 1951 (E. C. Zimmerman); eight specimens, on Rhododendron, Kew Botanical Gardens, Surrey, England; four September 24, 1950 (R. A. W. Wynn), and four September 17, 1950 (D. J. Clark); seven specimens on Rhododendron, Chobham, Surrey, England, August 31, 1936; three specimens, same locality and host plant, August, 1936 (H. St. J. Donisthorpe); two specimens, Weybridge, Surrey, England, September 22, 1963 (P. S. Broomfield) (all in BM). Holotype on indefinite loan to USNM.

Since the above was written, I have received a number of specimens from Rhododendron in Oregon, where the species was probably introduced and has become established.

I take pleasure in naming this species in honor of Dr. Ronald Gordon Fennah, Director of the Commonwealth Institute of Entomology, who has made major contributions to our knowledge of the anchenorrhynchous Homoptera.



FIGURES 713-715.—713, *Graphocephala flavovittata* Metcalf (from specimen from Pequete, Panama Canal Zone): *p*, Aedeagus and paraphyses, from lateral view. 714, *G. depicta*, n. sp., holotype: *p*, Aedeagus and paraphyses from lateral view. 715, *G. clepsydra* (Fowler) (*a* from specimen from Guatemala; *i* from lectotype; remainder from Costa Rica): *p*, Aedeagus and paraphyses, from lateral view.

G. fennahi, n. sp., is very similar in appearance to *G. coccinea* (Forster) in which the male does not have the dorsoapical pygofer projection. Also, usually the orange markings of the forewings are more extensive in most specimens of *coccinea* than even the most extensively marked specimens of *fennahi*, but this difference tends to break down in the northern part of the range of *coccinea*, e.g. Massachusetts, Ontario, and Michigan, where *fennahi* is not found.

G. fennahi was formerly confused with *coccinea* which has a larger range and more varied food plants. It is remarkable that although Olsen (1918b:120) conferred names, perhaps unintentionally, on varieties now placed in synonymy under *coccinea* (Forster), he recognized one form from North Carolina on *Rhododendron maximum* as more distinct. He described the specimens as yellowish-brown to dark velvety brown, but this may have been the result of his light source. The host plant suggests that the specimens were the species described here as *fennahi*, but Olsen did not confer a name on it.

Morcos (1953a) gives an account of the introduction of *fennahi*, n. sp., (as *coccinea*) to England, and its biology, reporting that although nymphs and adults could be collected on plants other than Rhododendron, the eggs were laid in the sepals of the latter.

Graphocephala soluna, NEW SPECIES

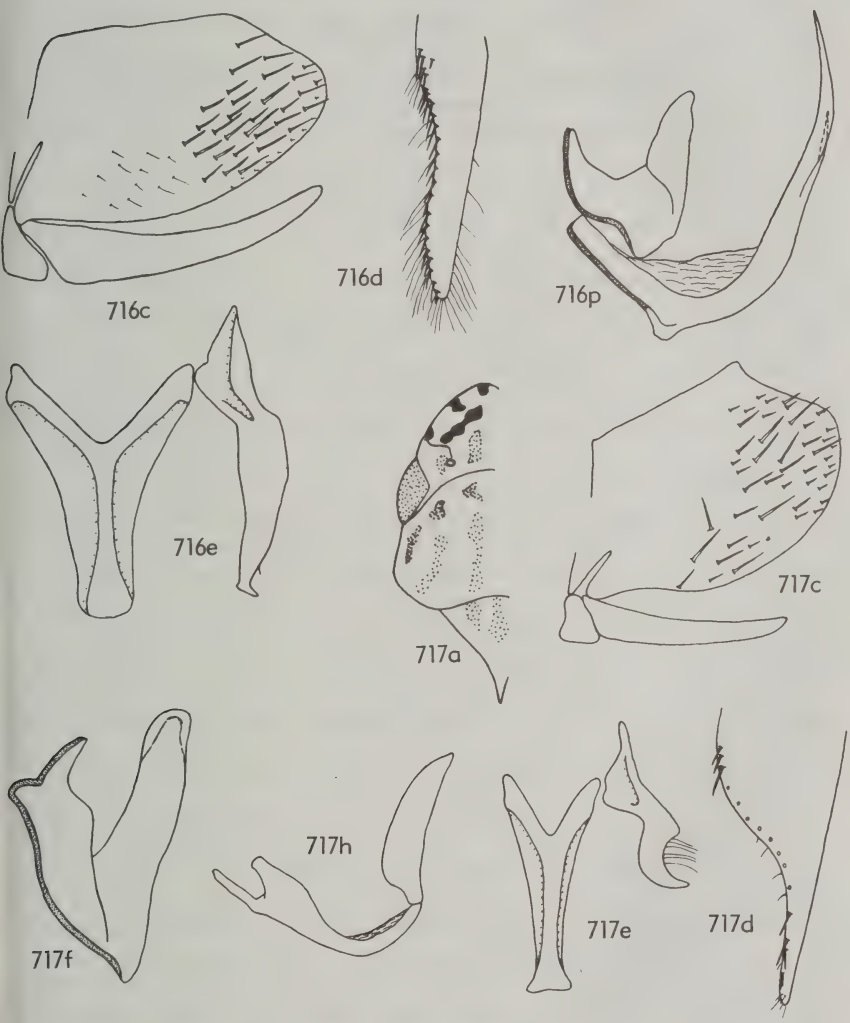
FIGURE 690, PAGE 857

Length of male 9.0 mm. Head with anterior margin subangulate in dorsal view, median length of crown slightly less than one-half interocular width and slightly less than one-third transocular width, ocelli located before a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, surface with round punctures on disk, lenticular punctures behind apex; antennal ledges with anterior margins oblique and slightly convex in lateral view; face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus with muscle impressions distinct. Thorax with pronotal width greater than transocular width of head, pronotal margins convergent anteriorly, disk transversely rugose; scutellum weakly rugulose behind transverse sulcus; forewing with veins indistinct, outer anteapical cell without supernumerary crossveins, hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Male pygofer broadly rounded at apex, with numerous macrosetae on apical half, with a dorsal anteapical undifferentially sclerotized process; plates extending as far posteriorly as pygofer apex; aedeagus in lateral view with a quadrate space between dorsal apodemes and shaft; paraphyses with rami both tapered gradually, one longer than other. Female unknown.

Color of crown, pronotum, and scutellum black, with a dull gray marking on each side of crown at base, and a number of dull gray dots on posterior two-thirds of pronotum; forewing dull reddish; face, thoracic pleura, and tibiae of first two pairs of legs black, remainder of thoracic venter and legs dull orange to red.

Holotype male, Potrerillos, Panama, June 1935, on indefinite loan to USNM from NCS.

Graphocephala soluna, n. sp., is similar to *G. punctulata* (Signoret), *G. edwardsi* (Signoret), and *G. aurolineata* (Fowler) in having a dorsal pygofer process, but is probably closest to *G. albomaculata* (Distant) which lacks the pygofer process but resembles *soluna* more closely in general habitus.



FIGURES 716, 717.—716, *Graphocephala albomaculata* (Distant) (from specimen from La Palma, Costa Rica): *p*, Aedeagus and paraphyses, from lateral view. 717, *G. aurora* (Baker) (from specimen from Guerrero, Mexico; *h* from lateral view).

Graphocephala penignava, NEW SPECIES

FIGURE 696, PAGE 863

Length of male 5.4 mm, of female 5.6-5.7 mm. Head moderately produced, median length of crown varying from seven-tenths to almost nine-tenths interocular width, and from slightly more than four-tenths to slightly more than seven-tenths transocular width, ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle, and median line of crown, surface with shallow elongate inconspicuous punctures; antennal ledges with anterior margins slightly oblique and usually rectilinear in lateral view, face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus with muscle impressions not very distinct. Thorax with pronotal width equal to transocular width of head, pronotal margins convergent anteriorly, disk very weakly transversely rugulose; scutellum not or inconspicuously rugose behind transverse sulcus; forewing with veins distinct in clavus and in region of anteapical and apical cells, outer anteapical cell usually not containing supernumerary crossveins, which may extend however from outer margin of this cell to costal margin (in one specimen the crossveins involve the entire outer anteapical cell, as in *G. versuta* (Say)), hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Male pygofer well produced, with a slender, acute process arising near middle of dorsal margin, extending ventrally, apical margin broadly convex; plates extending posteriorly as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly approximately as far as apex of connective; aedeagal shaft short, without processes, dorsal apodemes conspicuous; paraphyses consisting of a basis and two rami of which the more anterior one is slightly shorter, both extending dorsally in lateral view. Female abdominal sternum VII strongly produced and narrowly rounded apically; ovipositor with primary teeth of second valvulae widely separated, acute apically; pygofer with setae almost all anteapical.

Color of crown yellow, with an apical black spot, with a linear arcuate black marking extending from dorsal portion of lateral clypeal suture towards apex on each side, occasionally confluent medially with its complement, with a pair of slender median longitudinal dark lines on posterior two-thirds of disk, delimiting a paler median line which is interrupted anteriorly by a median black spot, the paired median dark lines occasionally each curved posterolaterally at their anterior extremities; pronotum pale green anteriorly and laterally, remainder dark green; scutellum yellow with transverse sulcus and a pair of short marks on posterior half, black, most specimens with variable additional black scutellar markings; forewing dark green, basal one-half or more of costa and apical one-fourth of claval commissure narrowly dull-yellow, without a black spot in apex of any of apical cells; face with small brown and black variable markings; thoracic pleura dull yellow marked with black, legs and venter of abdomen dull yellow, apices of tarsi of first and second legs dark.

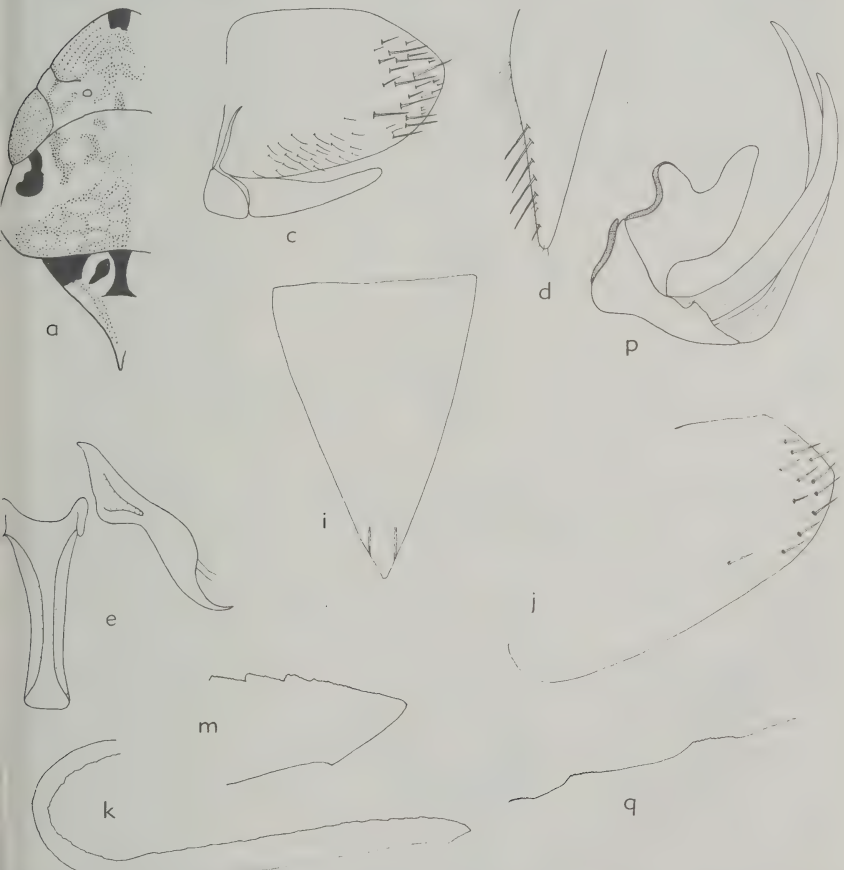
Holotype male and six additional males, Mexico City, D. F., September 13, 1939, eleven females, same data (DeLong collection, OSU).

G. penignava, n. sp., is closely related to *G. ignava* Ball, but has more markings near the middle of the crown and lacks a distinct transcommissural pale spot at the claval apex. In the male genitalia, *penignava* has the pygofer process directed ventrally, instead of posteriorly as in *ignava* and the setae of the plates are longer than in *ignava*.

Graphocephala pulchra, NEW SPECIES

FIGURE 699, PAGE 865

Length of male 5.8 mm, of female 6.2-6.4 mm. Head well produced, median length of crown varying from slightly more than seven-tenths to slightly less than eight-tenths interocular width and from slightly more than four-tenths to



FIGURES 718.—*Graphocephala guerreroensis* (Fowler) (*c-e*, *p*, from specimen from Jacala, Mexico; remainder from Cuernavaca, Mexico): *p*, Aedeagus and paraphyses, from lateral view; *q*, basalmost teeth of second valvula.

slightly less than one-half transocular width, ocelli located behind a line between anterior eye angles, each slightly closer to median line than to adjacent anterior eye angle, surface with lenticular punctations; antennal ledges with anterior margins slightly oblique and convex; face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus with muscle impressions not very distinct. Thorax with pronotal width approximately equal to transocular width of head, lateral pronotal margins convergent anteriorly, disk weakly transversely rugulose, scutellum transversely rugulose behind transverse sulcus; forewing with veins not very distinct, outer anteapical cell without supernumerary crossveins, hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male genitalia as in *G. penignava*, n. sp. (above), except that pygofer process extends straight posteroventrad and is not strongly decurved as in *penignava*, and that the dorsal aedeagal apodemes are not as well developed as in *penignava*. Female abdominal sternum VII not strongly produced, posterior margin with a slightly produced median obtusely angular projection between a small convex lobe on each side; ovipositor with valvula II bearing widely separated primary teeth, acute apically; pygofer with setae in an anteapical group which extends slightly anteroventrally along posteroventral margin (similar to *G. hieroglyphica* (Say), fig. 724*j*).

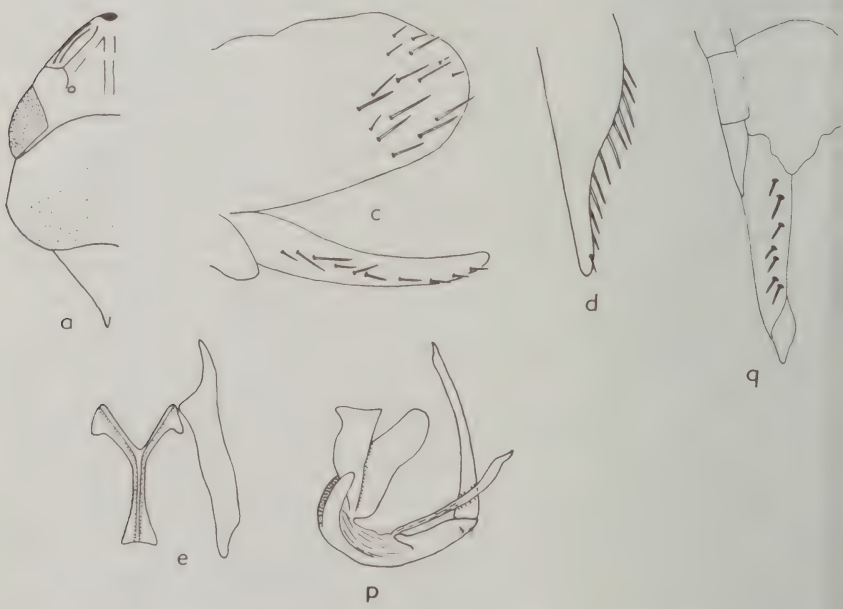


FIGURE 719.—*Graphocephala rufimargo* (Walker) (*a* from specimen from Morelos, Mexico; *q* from Guatemala; remainder from Costa Rica): *p*, Aedeagus and paraphyses, from lateral view; *q*, female abdominal apex, from ventral view.

Crown tan with narrow median line and an oblique narrow line on each side ivory, narrowly margined with black, converging apically but with the three ivory markings not connected, apex black, area behind dorsal portion of lateral clypeal sutures ivory marked with black, remainder brown, with white arcs on muscle impressions; pronotum with a broad anterior marginal pale brown area, remainder darker, with five pale longitudinal lines extending from anterior to posterior margin; scutellum with a complex and somewhat variable pattern of black and yellow, but consistently with narrow median line in apical half, a pair of arcuate markings in median portion of basal half, and at least the basal half of each lateral margin, narrowly yellow; forewings dull brown, veins darker brown, with a number of pale areoles in cells of corium; face, venter, and legs yellow.

Holotype male, Urupan, Michoacán, Mexico, October 1, 1941 (DeLong, Caldwell and Plummer); two females, Chilpancingo, Guerrero, Mexico, October 10, 1939 (DeLong and Plummer); one female, Jiutepec, Morelos, Mexico, September 6, 1939 (DeLong and Plummer) (DeLong collection, OSU). One female, 6 miles north of Cuernavaca, Morelos, Mexico, 7500 feet, August 15, 1954 (J. G. Chilcott) (CNC).

G. pulchra, n. sp., is similar to *G. spinosa* (DeLong and Currie) and to *G. gemella* (DeLong and Currie) in the location and form of the pygofer process of the male. *G. dohrni* (Signoret) appears to belong to this group, also. The size and color pattern will serve to distinguish it from *pulchra*. The color pattern (fig. 702) of *gemella* is somewhat different from that of *pulchra*. The form of the aedeagus and the length of the pygofer process of *spinosa* both differ from *pulchra*.

Graphocephala sasaima, NEW SPECIES

FIGURE 730, PAGE 898

Length of male 5.7-5.9 mm, of female 6.0-6.4 mm. Head well produced, median length of crown varying from approximately seven-tenths to more than eight-tenths interocular width and from slightly less than one-half to less than six-tenths transocular width, ocelli located on a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle, surface without lenticular impressions near apex or on disk; antennal ledges with anterior margins slightly oblique and rectilinear in lateral view; face usually with a very slender lenticular sclerite bordering lateral clypeal suture on each side, clypeus with muscle impressions very weak. Thorax with pronotal width approximately equal to transocular width of head, lateral pronotal margins parallel, disk not transversely rugulose; scutellum not transversely rugose behind transverse sulcus; forewing with veins not very distinct except at apex, outer anteapical cell without supernumerary veins, hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer moderately produced, without processes, posterior margin regularly convex except for a slight dorsoapical concavity; plates not extending nearly as far posteriorly as pygofer apex, with weak uniseriate

macrosetae; style extending posteriorly as far as apex of connective, aedeagal shaft short with a pair of spinelike apical processes; paraphyses consisting of a basis and two similar rami extending dorsally. Female abdominal sternum VII strongly produced, posterior margin with median portion slightly produced and regularly convex; ovipositor second valvulae as described above for *G. fennahi*, n. sp.; pygofer setae much as in illustration of *G. hieroglyphica* (Say) (fig. 724*j*).

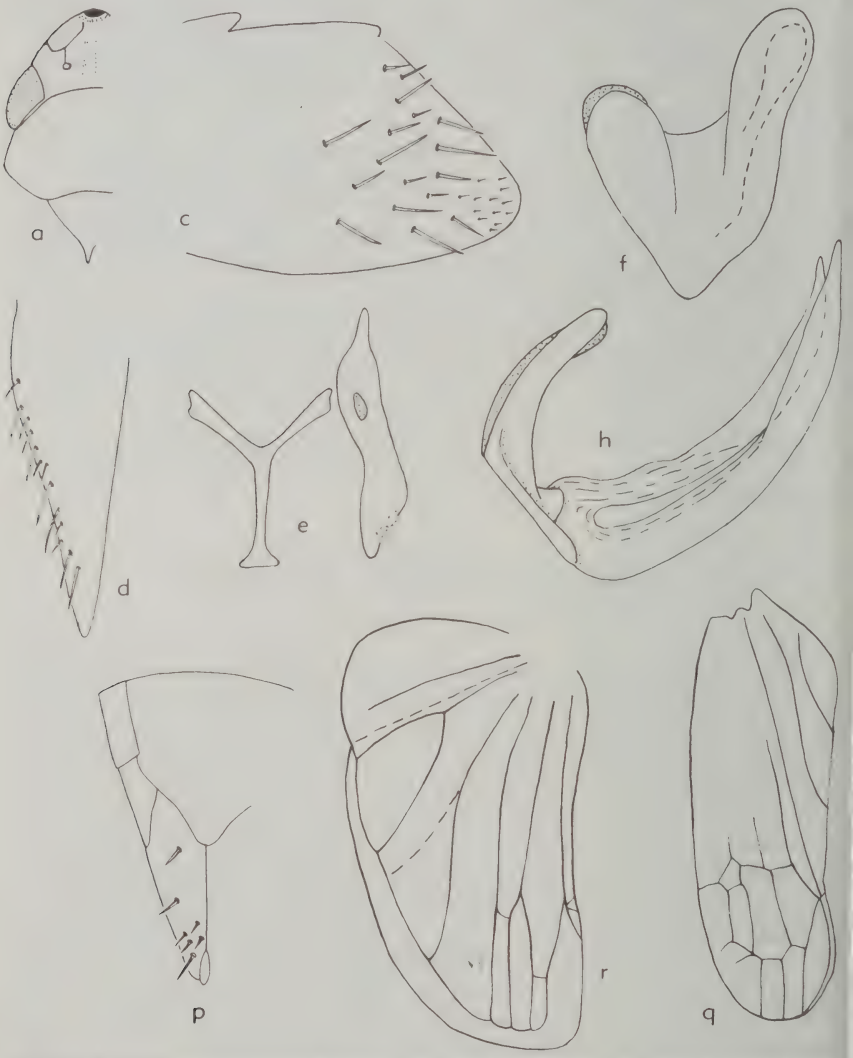


FIGURE 720.—*Graphocephala alagarta*, n. sp. (*a*, *p*, from specimen from Yepocapa, Guatemala; *q*, *r*, from topotype; remainder from holotype; plate not shown in *c*; *h* from lateral view): *p*, Female abdominal apex, from ventral view; *q*, *r*, fore- and hindwing, respectively.

Head with an ivory submarginal band along anterior margin from eye to eye, bordered anteriorly by narrow black margin of crown and behind by a parallel narrow black line, remainder of crown yellow marked variably with narrow black lines; pronotum dull green with a broad anterior pale yellowish marginal band; scutellum dull yellow; forewings translucent yellowish-green with humeral margins and claval sutures narrowly blue, with black spots in apices of second, third, and fourth apical cells; proepimeron with a black line beneath dorsopleural carina, face, remainder of thoracic pleura, venter, and legs yellow.

Holotype male and five additional males and eight females, Sasaima, Cundinamarca, Colombia, 1000 meters, December 13, 1960 (M. Revelo), on tea; eight males and one female, same locality except 1500 meters, January 4, 1961 (M. Revelo) on "Matorral". Holotype in USNM, remainder in Rockefeller Foundation collection, Medellín, Colombia.

G. sasaima, n. sp., is similar in appearance to *G. apicata*, n. sp., to *G. rufimargo* (Walker) and to several other similar species. The spinelike apical processes on the aedeagus of the male will readily separate *sasaima* from all other species in the genus.

Graphocephala apicata, NEW SPECIES

FIGURE 703, PAGE 867

Length of male 4.5-4.7 mm, of female 4.8-5.1 mm. Head moderately produced, median length of crown varying from slightly less than two-thirds to slightly more than three-fourths interocular width and from slightly more than four-tenths to slightly more than one-half transocular width, ocelli located on a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown, surface with weak lenticular impressions; antennal ledges with anterior margins almost vertical and slightly concave in lateral view; face usually without a lenticular sclerite bordering lateral clypeal suture on each side below eye (very narrow when present), clypeus with muscle impressions not very distinct. Thorax with pronotal width approximately equal to transocular width of head, lateral pronotal margins parallel, disk not transversely rugulose, scutellum not transversely rugose behind transverse sulcus; forewing with veins not very distinct except at apex, outer anteapical cell with an extra crossvein (in one wing of one of specimens available) or not; hindleg with length of first posterior tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer moderately produced, posterior margin with a posterodorsal concavity, broadly convex apically; plates not extending nearly as far posteriorly as pygofer apex, each with few uniseriate macrosetae; style not extending posteriorly as far as apex of connective; aedeagal shaft short, dorsal apodemes conspicuous; paraphyses consisting of a basis and two rami extending dorsally, the more posterior one longer, in caudal view both very much broader than in lateral view. Female abdominal sternum VII and pygofer as in illustration of *G. hieroglyphica* (Say) (fig. 724); genital chamber

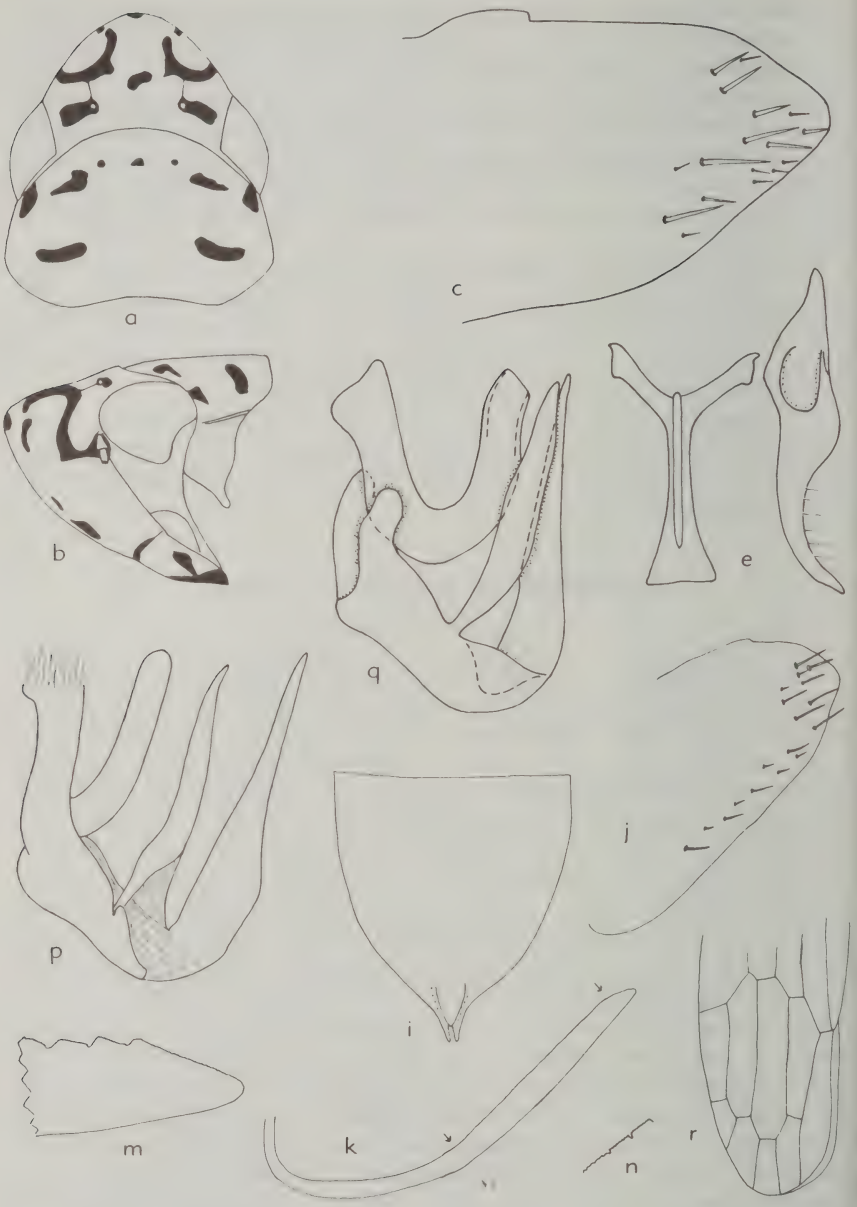


FIGURE 721.—*Graphocephala atropunctata* (Signoret) (*a*, *b*, *p*, from specimen from Glendale, California; *c*, *e*, *q*, from Berkeley, California; remainder from near Palo Alto, California; plate not shown in *c;* arrows show extremities of toothed portion in *k*): *p*, *q*, Aedeagus and paraphyses, from lateral view; *r*, apex of forewing.

with a lobate sclerite on each side. Teeth of second valvulae of ovipositor as in *hieroglyphica*.

Head with an apical black spot, in dorsal view with an ivory submarginal band from eye to eye along anterior margin, not bordered anteriorly by a black line (although appearing so in some specimens as a result of one or more dark clypeal muscle impressions and a dark marking on antennal ledge), the ivory band narrowly bordered posteriorly in black, with median line of crown pale, often concolorous with anterior band and confluent or not with it, bordered narrowly with black; remainder of crown yellow; pronotum varying from concolorous with crown to dark green except for broadly paler anterior marginal area; scutellum concolorous with crown; forewing translucent olive, with veins distinct in apical half, humeral margins and claval sutures narrowly very pale blue, with inner half of first apical cell and apical portions of remaining apical cells smoky hyaline; face with black markings of variable extent, with at least the most dorsal of the muscle impressions black; with a dark proepimeral marking below the dorsopleural carina, remainder of pleura, venter, and legs yellow.

Holotype male and one female, Mexcala, Guerrero, October 2, 1945 (Balock, DeLong, Hershberger); two females, same locality except "K.247", October 22, 1941 (DeLong, Good, Caldwell and Plummer); one male, Huetamo, Michoacán, M. F. 3101, August 22, 1933; and one male, Cuernavaca, Morelos, September 2, 1939 (DeLong and Plummer), all localities in Mexico, (DeLong collection, OSU).

G. apicata, n. sp., is similar in appearance to *G. sasaima*, n. sp., and to *G. redacta* (Fowler), both of which lack the black spot at the apex of the head which is present in *apicata*. *G. apicata* also lacks the aedeagal processes present in *sasaima*. *G. apicata* is also similar to *G. penignava*, n. sp., which also possesses the apical spot on the head, but the latter has a pygofer process which is absent in *apicata*.

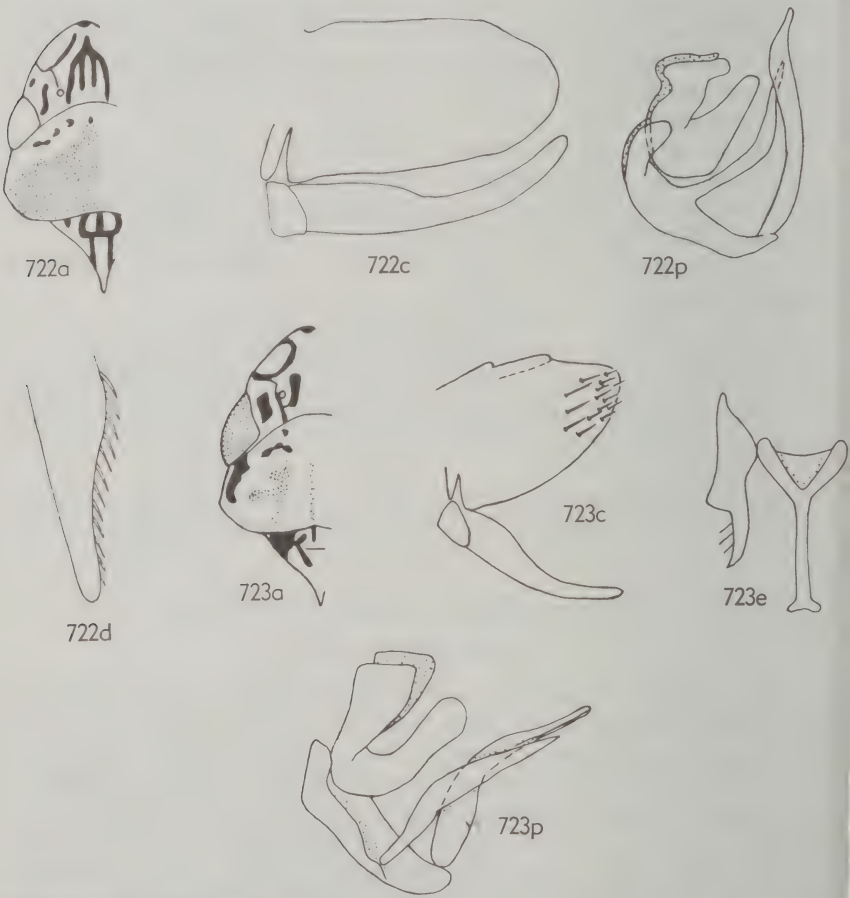
Since the above was written, I have seen a series of specimens collected on *Lantana camara* L. in San Blas, Nayarit, Mexico, by N. L. H. Krauss (USNM).

Graphocephala delongi, NEW SPECIES

FIGURE 705, PAGE 869

Length of male 5.7 mm. Head well produced, median length of crown more than eight-tenths interocular width and approximately one-half transocular width, ocelli located behind a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, surface of crown with lenticular punctations from base to apex between ocelli; antennal ledges with anterior margins vertical and slightly concave in lateral view; face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus with some of muscle impressions conspicuously marked. Thorax with pronotal width greater than transocular width of head, lateral pronotal margins convergent anteriorly, disk not transversely rugulose; scutellum weakly transversely rugulose behind transverse sulcus; forewing with veins distinct, membrane consisting only of inner portion of inner apical

cell, outer anteapical cell without supernumerary crossveins, base of outer anteapical cell located more distally than bases of inner two anteapical cells; hindleg with length of first posterior tarsomere greater than combined length of two more distal tarsomeres. Male pygofer moderately produced with posterior margin broadly convex except near dorsal margin where it is slightly concave (fig. 705*c*), without processes; plates not extending nearly as far posteriorly as pygofer apex, each with uniseriate macrosetae; style not extending posteriorly nearly as far as apex of connective; aedeagal shaft very short, without processes, dorsal apodemes short; paraphyses consisting of a basis and two dissimilar rami, the posterior one longer and directed dorsally, the anterior one shorter and directed posterodorsally, in lateral view crossing the anterior ramus. Female unknown.



FIGURES 722, 723.—722, *Graphocephala kukla*, n. sp., holotype (setae not shown in *c*): *p*, Aedeagus and paraphyses, from lateral view. 723, *G. torqua* (DeLong and Currie) (*a* from holotype; remainder from Desierto de los Leones, Mexico): *p*, Aedeagus and paraphyses, from lateral view.

Head with crown dull ivory, with a complex median dark brown to black design (fig. 705*a*), three black spots at apex and with faint brown marking along suture and giving off a branch towards apex of head and another toward inner eye margin; pronotum with a pair of broad longitudinal ivory bands that diverge posteriorly to humeral margins and a pair of narrower undulate ivory bands extending from anterior one-third to posterior margin near median line of scutellum, remainder brown, shading to black; scutellum ivory with basal angles black and a pair of narrow longitudinal brown stripes near median line; forewing pale brown with veins darker, a conspicuous longitudinal ivory band forming a continuation of each of the more lateral ivory bands of the pronotum, extending posteriorly diagonally across claval suture near its midlength, narrowing opposite claval apex and extending along margin of inner apical cell to wing apex, the band bordered with dark brown through most of its length, with a less conspicuous pale band along commissural margin; face brown with yellow markings, apex of clypellus black; proepimeron brown with yellow markings; thoracic sterna black.

Holotype male, Buena Vista, Guerrero, Mexico, K.340, October 23, 1941 (DeLong, Good, Caldwell and Plummer) (DeLong collection, OSU).

G. delongi, n. sp., is similar in form and male genital structures to *G. teres* (Fowler) from which it differs markedly in color pattern. *G. delongi* is also slightly more robust than *teres*.

G. delongi, n. sp., is named in honor of Dr. D. M. DeLong whose collection of Mexican Cicadellinae has contributed very greatly to the present study.

Graphocephala simulata, NEW SPECIES

FIGURE 709, PAGE 873

Length of male 7.3-7.9 mm, of female 7.6-7.9 mm. Head moderately produced, median length of crown varying from slightly less than one-half to slightly more than one-half interocular width and from three-tenths to slightly more than one-third transocular width, ocelli located on a line between anterior eye angles, each slightly closer to median line than to adjacent anterior eye angle, broad median area of crown punctate, the punctations lenticular or changing to longitudinal rugae on posterior half, dorsal surface of ocellocular area obliquely rugose anterolaterad of ocellus on each side; antennal ledges with anterior margins oblique and convex in lateral view; face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus with muscle impressions not very distinct. Thorax with pronotal width equal to transocular width of head, lateral pronotal margins convergent anteriorly, disk transversely rugose, scutellum transversely rugose behind transverse sulcus; forewing with veins distinct, outer anteapical cell with one or a few supernumerary crossveins in some specimens, outer apical cell usually with one supernumerary crossvein; hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres. Male pygofer moderately produced, with posterior margin as described above in *G. delongi*, n. sp., without processes; plates extending posteriorly as far as pygofer apex,

each with numerous small multiseriate setae; style extending posteriorly beyond apex of connective; aedeagal shaft very long, widened and truncate at apex; paraphyses with two reduced membranous rami. Female abdominal sternum VII and pygofer very similar to my illustrations (fig. 712) of *G. appropinquans* (Fowler), except that there are a few more setae along posteroventral pygofer margin; second valvulae also as in figure 712*k*, but more acute apically, and the series of heavily sclerotized dorsal areas limited to apical half of valvula.

Ground color of head, anterior submarginal area of pronotum, and scutellum bright to sordid yellow, crown variously marked with black but more heavily so in median area between ocelli and with an apical black spot;

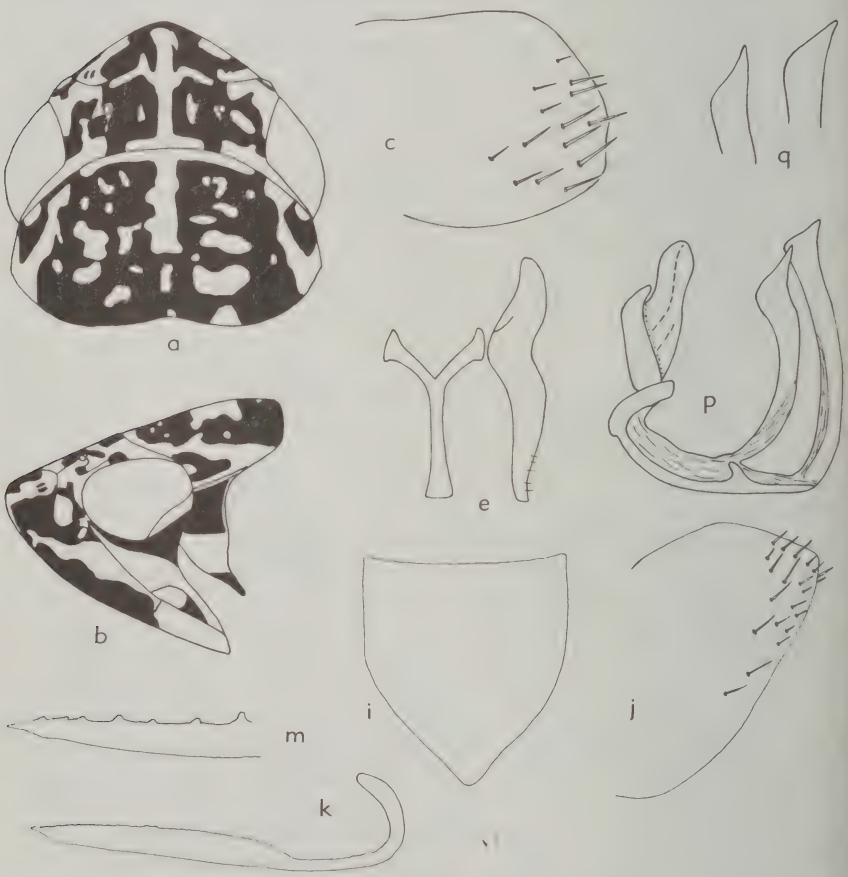


FIGURE 724.—*Graphocephala hieroglyphica* (Say) (*a*, *b*, from specimen from Midland County, Michigan; *c* from Bluffs, Illinois; *c*, *e*, from Macon, Georgia, *q*, from Pottawotomie County, Kansas; remainder from Langdon, Missouri; plate not shown in *c*): *p*, Aedeagus and paraphyses; from lateral view; *q*, apices of paraphyses, from lateral view.

remainder of pronotum dark, usually with purplish reflections and variously marked with black; scutellum with a triangular black spot bordering anterior margin in basal angles, a pair of black lateral anteapical marks connected apically by black tip of scutellum; forewing concolorous with darker portion of pronotum, paler apically but without a sharply limited membrane; often with a broad pale band along claval suture; face with dorsal half of clypeus usually black with a pale median marking, remainder of face pale or sordid yellow, often with a narrow median mark on clypellus and/or loral sutures black, with additional black facial markings in a few specimens; mesepisternum with a black mark, remainder of pleura, venter, and legs, yellow.

Holotype male, Tacuba, D. F., Mexico, May 16, 1922 (E. G. Smyth) (USNM). Three males and one female, Puente Nacional, Vera Cruz, Mexico, June 21, 1962 (D. H. Janzen); three males and one female Ajacuba, Hidalgo, Mexico, 8000 feet, June 21, 1937 (M. A. Embury) (UCAL). One female, E. Libres, Puebla, Mexico, August 20, 1958 (H. F. Howden) (CNC). One male, Zitacuara, Michoacán, Mexico, K.159, September 28, 1945 (Plummer, DeLong, Hershberger, Elliott); two males, one female, "H034", Tancitaro, Michoacán, Mexico, August 9, 1940; three females, same data as preceding except "H020" and July 11, 1940; one male and one female, same data as preceding except "H038" and August 16, 1940 (DeLong collection, OSU).

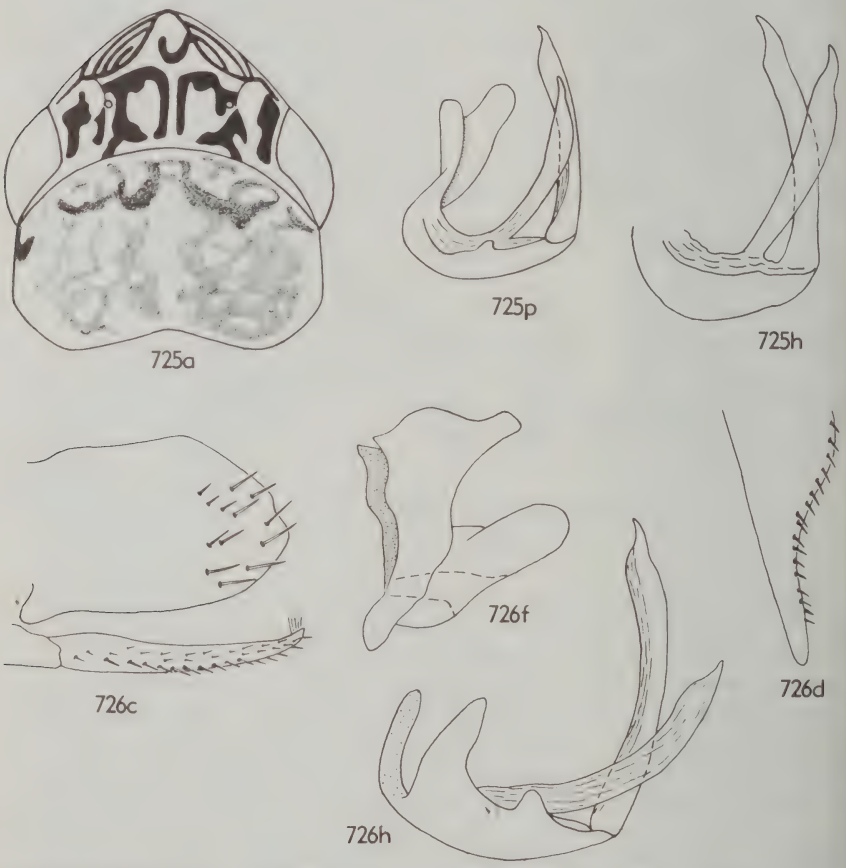
In size and general appearance, *G. simulata*, n. sp., is similar to *G. guerreroensis* (Fowler) and *G. appropinquans* (Fowler), and the structure of the female genitalia support such a relationship. The elongate aedeagus of *simulata*, unlike any other species in the genus *Graphocephala*, will separate it from these two species. The 2:1:0 formula of the hind femora is quite unusual in *Graphocephala*. The hind knees do not extend forward as far as the posterior proepimeral margin, an unusual condition in the Cicadellini, and mentioned in part 1 (p. 16) of the present work.

Graphocephala depicta, NEW SPECIES

FIGURE 714, PAGE 879

Length of male 5.4-5.7 mm, of female 5.7-5.9 mm. Head well produced, median length of crown varying from three-fourths to almost nine-tenths interocular width and from slightly less than one-half to approximately six-tenths transocular width, ocelli located behind a line between anterior eye angles, each slightly closer to median line of crown than to adjacent anterior eye angle, surface of crown with lenticular impressions from base to apex between ocelli; antennal ledges with anterior margins oblique and either rectilinear or convex; face without a lenticular sclerite bordering lateral clypeal suture on each side, clypeus with muscle impressions not very distinct. Thorax with pronotal width equal to or greater than transocular width of head, lateral pronotal margins convergent anteriorly, disk transversely rugulose; scutellum transversely rugose behind transverse sulcus; forewing with veins distinct, membrane consisting of entire inner apical cell and occasionally apical portions of remaining apical cells, outer anteapical cell without supernumerary crossveins, base of outer anteapical cell located more

distally than bases of inner two anteapical cells, hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer as in *G. delongi*, n. sp.; plates extending posteriorly beyond pygofer apex, each with uniseriate small macrosetae; style not extending posteriorly nearly as far as apex of connective; aedeagus moderately long for the genus, without processes, dorsal apodemes short; paraphyses consisting of a basis and two fairly similar rami of which the posterior is broader than the anterior one, both directed dorsally. Female abdominal sternum VII strongly produced posteriorly, gradually narrowed and with three small median apical lobes; ovipositor with slanting, close-set primary teeth on second valvula, over slightly more than apical one-half of its dorsal margin, each of



FIGURES 725, 726.—725, *Graphocephala confluens* (Uhler) (*a* from specimen from Shively County, California; *h* from Lyon County, Nevada; *p* from Clearfield, Utah; *h* from lateral view): *p*, Aedeagus and paraphyses, from lateral view. 726, *G. uhleri* (Ball) (from specimen from Yolo Valley, California; *h* from lateral view).

the primaries with minute secondary denticles, apex very similar in form to that of *G. fennahi*, n. sp., and with anteapical posteroventral and posterodorsal denticles; pygofer with form and chaetotaxy much as in *G. hieroglyphica* (Say) (fig. 724*j*).

Head with crown greenish-yellow marked with a large median angular to sagittate black area which is marked with a narrow median yellow line and a few much smaller yellow spots that vary in location; pronotum with a broad lateral yellow stripe on each side including a short narrow longitudinal dark mark above dorsopleural carina behind each eye, disk of pronotum dull greenish-gray to greenish-brown with a black spot anteriorly on each side, anterior margin yellow, narrower than the lateral stripes which it connects; scutellum black with yellow markings; forewings with two longitudinal stripes, each a continuation of one of the lateral pronotal stripes, extending across claval suture near midclavus, posteriorly in brachial cell and inner anteapical cell to its apex, clavus of each forewing brown mesad of pale stripe, corium green with black veins; face yellow, with four spots on margin with crown, in addition to the apical spot, black; mesepisternum with a black stripe, remainder of pleura, venter, and legs, yellow.

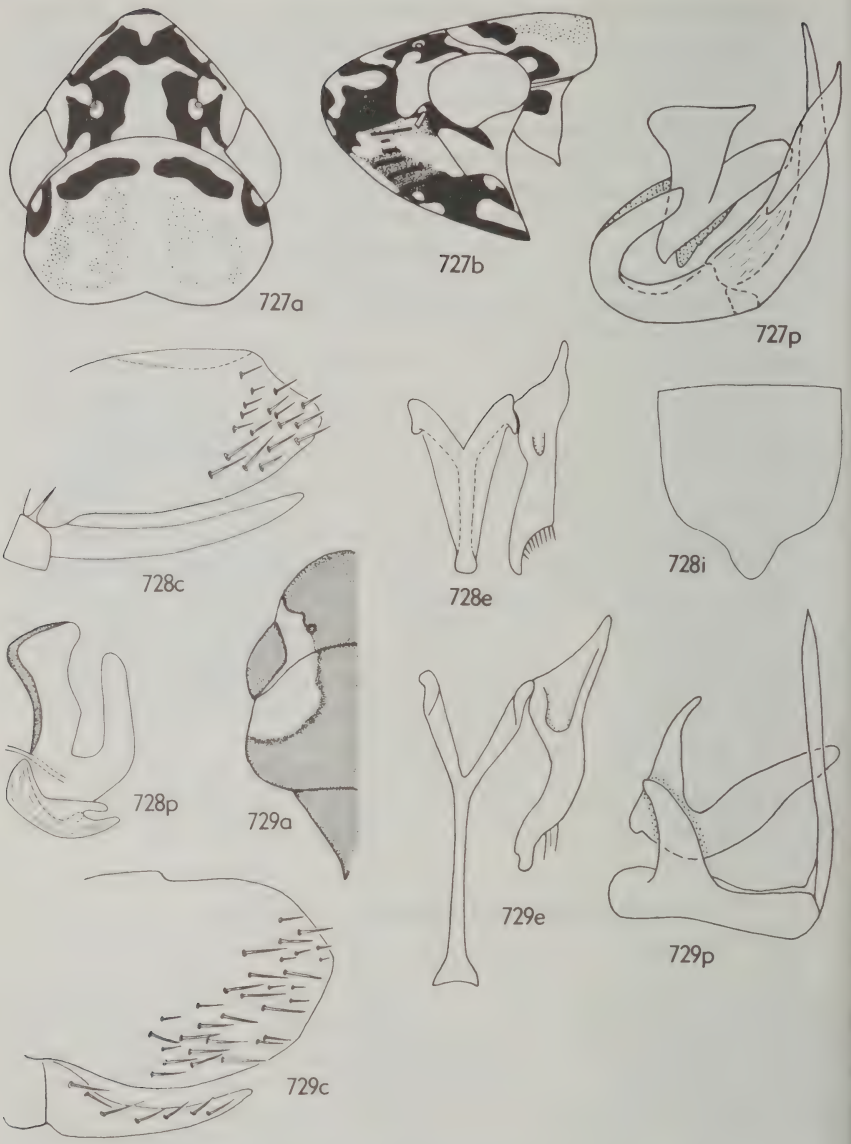
Holotype male and one female, Desierto de los Leones, MF 2921, November 5, 1933, Distrito Federal, Mexico; three males, Desierto de los Leones, D. F., October 9, 1945 (DeLong, Hershberger, Elliott); one male, Mexico City, D. F., October 22, 1945 (same collectors); four males and five females, Cuernavaca, Morelos, Mexico, K.57, October 21, 1941 (DeLong, Good, Caldwell, Plummer); one male and one female, M. B. 113, Mexico (A. Dampf); one female, M. F. 7317, Mexico; one female, Acapulco Road, Mexico, November 22, 1938 (J. S. Caldwell) (DeLong collection, OSU).

G. depicta, n. sp., is very similar in form to *G. delongi*, n. sp., (p. 889), differing in color pattern of the anterior dorsum (figs. 705*a* and 714*a*) and in the aedeagus of the male which is longer and more slender in *depicta*.

Graphocephala alagarta, NEW SPECIES

FIGURE 720, PAGE 886

Length of male 4.4-5.0 mm, of female 4.8-5.4 mm. Head moderately produced, median length of crown varying from two-thirds to almost eight-tenths interocular width and from four-tenths to one-half transocular width, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, entire surface sculptured, the impressions in median area lenticulate; antennal ledges with anterior margins oblique and almost rectilinear in lateral view; face without a lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus with muscle impressions distinct in female, not so in male. Thorax with pronotal width greater than transocular width of head, lateral pronotal margins convergent anteriorly, disk strongly transversely rugose; scutellum transversely rugose behind transverse sulcus; forewing with veins distinct and elevated, outer anteapical cell occasionally with a supernumerary crossvein, hindleg with length of first tarsomere greater than combined length of two



FIGURES 727-729.—727, *Graphocephala minuènda* (DeLong and Currie) (*p* from specimen from Hidalgo, New Mexico; remainder from Douglas, Arizona): *p*, Aedeagus and paraphyses, from lateral view. 728, *G. lurida* (DeLong and Currie) from specimens from Chilpancingo, Guerrero, Mexico): *p*, Aedeagus and paraphyses, from lateral view. 729, *G. lucasi* (Signoret) (*a* from specimen from Guatemala; remainder from Jalapa, Vera Cruz, Mexico): *p*, Aedeagus and paraphyses, from lateral view.

more distal tarsomeres. Male pygofer with posterodorsal margin much more elongate than in other species of *Graphocephala*, with macrosetae of varying sizes on posterior half, without processes; plates not extending as far posteriorly as pygofer apex, each with multiseriate macrosetae; style not extending posteriorly beyond apex of connective; aedeagal shaft of moderate length, without processes; paraphyses consisting of a basis and two rami of almost equal width and length, extending dorsally and slightly anteriorly. Female abdominal sternum VII moderately produced posteriorly and rounded apically; pygofer and second valvula of ovipositor very much like illustration of *G. hieroglyphica* (Say) (fig. 724).

Head dull yellowish-green with at least apical spot and a pair of parallel lines near median line, black, with variable additional black markings, occasionally with a median inverted anchor-shaped pattern outlined in black; pronotum with a broad anterior marginal band concolorous with crown, disk dark green. Scutellum concolorous with crown, with transverse sulcus dark and occasionally with a narrow dark line extending forward from each extremity; forewings dark green, membrane variable but at least including all of inner apical cell. Clypeus and clypellus varying from completely black (most males) to black marked with yellow or yellow marked with black, genae, lora, and thoracic pleura yellow and black in variable proportions, thoracic sterna black, legs mostly sordid yellow, or black near base; abdomen of male variable, yellow to black, male plates with at least their apical portions black; abdomen of female usually dull yellow.

Holotype and two additional males and one female, "Yepocapa", Guatemala, August 1949 (H. T. Dalmat); all other specimens, same data except date: one female, May 1948; one male, two females, June, 1948; two males, two females, August, 1948; two males, one female, September, 1948; two males, two females, October, 1948; five males, three females, December, 1948 (USNM). The locality is presumably San Pedro Yepocapa in Chimaltenango Province.

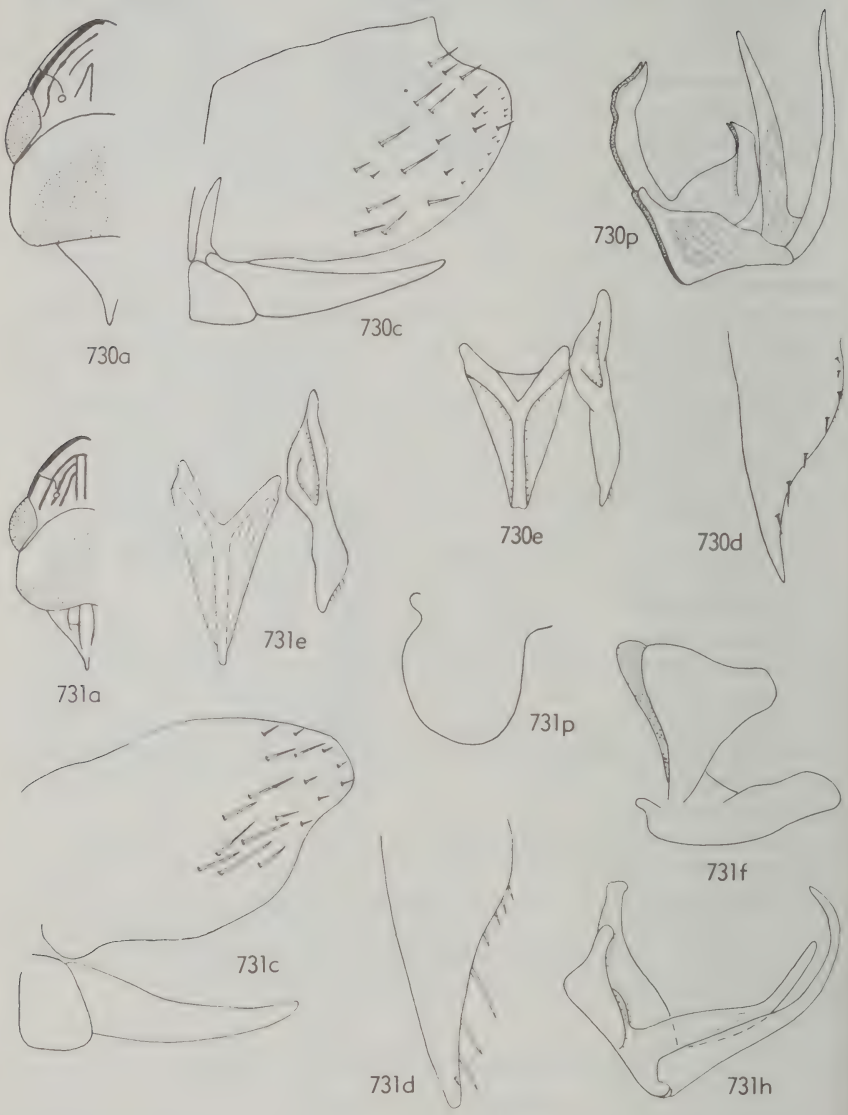
A series of specimens of both sexes from Antigua, Guatemala (USNM) was received after the above was written.

G. alagarta, n. sp., is similar to *G. rufimargo* (Walker) and a number of other species, from all of which it may be separated externally by its more robust form, but more reliably by the shape of the posterior margin of the pygofer which is unlike any of the other fairly similar species.

Graphocephala kukla, NEW SPECIES

FIGURE 772, PAGE 890

Length of male 4.7-5.2 mm, of female 6.1-6.2 mm. Head well produced, median length of crown varying from six-tenths to eight-tenths interocular width, and from slightly more than one-third to one-half transocular width, ocelli located slightly behind a line between anterior eye angles, and each approximately equidistant from median line and adjacent anterior eye angle, surface with lenticular impressions on disk between ocelli and back to basal margin, irregularly and obscurely rugose elsewhere; antennal ledges oblique



FIGURES 730, 731.—730, *Graphocephala sasaima*, n. sp. (from specimen from Sasaima, Colombia): *p*, Aedeagus and paraphyses, from lateral view. 731, *G. redacta* (Fowler) (from specimen from Chiriquí, Panama: *h* from lateral view): *p*, Sternal abdominal apodeme, from ventral view.

and slightly concave in lateral view; face without a lenticular sclerite bordering lateral clypeal suture on each side, clypeus with muscle impressions very weak. Thorax with pronotal width slightly greater than transocular width of head, lateral pronotal margins convergent anteriorly, disk not transversely rugulose, scutellum not transversely rugose behind transverse sulcus; forewing with veins not very distinct, hindleg with length of first tarsomere greater than combined length of two more distal tarsomeres. Male pygofer well produced with posterior margin convex except for a weak concavity near dorsal margin, with macrosetae of several sizes arranged irregularly on posterior half, without processes; plates extending posteriorly beyond pygofer apex, each with uniseriate macrosetae; style extending posteriorly slightly beyond apex of connective; aedeagal shaft short, without processes, dorsal apodemes conspicuous; paraphyses consisting of a basis and two dissimilar dorsal rami of which the posterior one is the longer. Female abdominal sternum VII moderately produced posteriorly and angulate at apex (much as in *G. pulchra*, n. sp., (fig. 699*i*)); pygofer and second valvula of ovipositor much like illustration of *G. hieroglyphica* (Say) (fig. 724) except that toothed area of second valvula extends further proximad, more like the illustration of *G. coccinea* (Forster) from Bar Harbor, Maine (fig. 686*k*).

Head greenish-yellow, an apical spot, a small spot on each antennal ledge, an oblique linear marking on ocellocular area near inner eye margin, a broader linear mark on upper margin of area of muscle impressions, and a median inverted dichotomous pattern of narrow lines with four ultimate rami, black; pronotum with a broad anterior marginal band which is concolorous with ground color of crown, and bearing a few black markings, remainder dark green; scutellum concolorous with crown, with a pair of median contiguous narrow black ovals and a narrow black line extending posteriorly from each of these and ending in lateral scutellar margin slightly before apex, with a short black mark on each side between the more median oval and the basal angle. Forewing sordid green with veins darker at least at apex; membrane fumose and including all or a part of inner apical cell and a spot in apices of other apical cells. Face yellow with variable black markings on some of sutures; thoracic sterna varying from all black to partly yellow, the black extending onto lower portions of proepimeron and mesopleura; proepimeron with a broad black band behind eye extending beneath dorsopleural carina for half length of latter. Legs stramineous.

Holotype male and three additional males and two females, Monte Cristo, El Salvador, May 7-9, 1958 (O. L. Cartwright) (USNM).

G. kukla, n. sp., resembles *G. redacta* (Fowler), and *G. sasaima*, n. sp., in several respects, but can be most readily separated from these species by its longer plates which extend as far posteriorly as the pygofer apex.

Graphocephala psephena, NEW SPECIES

FIGURE 732, PAGE 900

Length of male 7.1-7.3 mm, of female 7.8-7.9 mm. Head well produced, median length of crown varying from seven-tenths to more than eight-tenths

interocular width and from slightly less than one-half to slightly more than one-half transocular width, ocelli located on a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown, surface with lenticular impressions on disk; antennal ledges with anterior margins oblique and rectilinear in lateral view; face without a lenticular sclerite bordering lateral clypeal suture on each side, clypeus with muscle impressions distinct; thorax with pronotal width equal to (female) or greater than (male) transocular width of head, lateral pronotal margins convergent anteriorly, disk weakly transversely rugose or not; scutellum not transversely rugose behind transverse sulcus; forewing with veins distinct in male, not very distinct in female, without supernumerary crossveins, hindleg with length of first tarsomere approximately equal to combined length of two more distal tarsomeres.

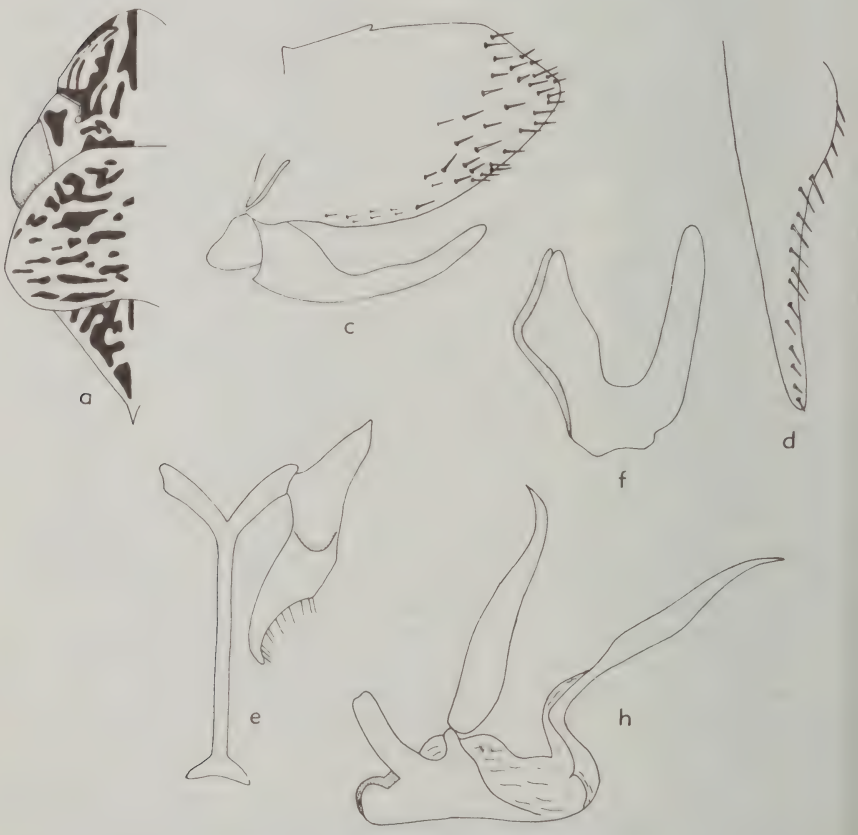


FIGURE 732.—*Graphocephala psephena*, n. sp. (from specimen from Lagunilla, Hidalgo, Mexico; *h* from lateral view).

Male pygofer moderately produced, without processes, posterodorsal margin slightly concave; plates not extending posteriorly nearly as far as pygofer apex, each with uniseriate macrosetae; style not extending posteriorly nearly as far as apex of connective; aedeagal shaft of moderate length for genus, without processes, dorsal apodemes conspicuous; paraphyses consisting of a basis and two slender acute rami extending posterodorsally in lateral veiw.

Female abdominal sternum VII very strongly produced and rounded apically; ovipositor with each second valvula toothed only in apical half of portion beyond basal curvature, the primaries sloping and with secondary denticles, with minute anteapical posterodorsal and ventral denticles, posterodorsal margin tapered to ventral margin, apex narrowly rounded; pygofer with numerous small macrosetae parallel to posterior and posteroventral margins.

Ground color of crown, anterior portion of pronotum, and scutellum yellowish-green, remainder of pronotum darker green, all marked with black lines and vermiculations, those of darker portion of pronotum transverse; forewing concolorous with darker portion of pronotum, with most of veins and the claval suture narrowly black, and with narrow black lines in some of the cells parallel to the longitudinal veins; face of male black except a pale green spot on each side of clypellus and in some specimens with a dull yellow spot on genae beneath antennal bases, antennal ledges yellow; face of female dull yellow with a median line on clypellus continued to apical portion of clypeus, and muscle impressions, tan; male with prothoracic pleura black except pale ventral margin of episternum and pale posterior margin of epimeron, legs tan except apical portion of hind femora which are black; female thoracic pleura and legs dull yellow, hindlegs suffused with dull red in some specimens.

Holotype and 18 additional males, La Marquesa Las Cruces N. P., Mexico, Mexico, July 5-9, 1965 (Flint and Ortiz); 4 males Lagunilla, Hidalgo, Mexico, Rt. 85, km. 132, July 4, 1965 (Flint and Ortiz); 1 male Morelos, Mexico, Lag. Zempoala, July 10-11, 1965 (Flint and Ortiz); 10 males, Dept. Suchitepequez, Guatemala, 1 mi. North of Finca La Maquina, June 11, 1966 (O. S. Flint) (USNM). Also, 2 females, 17 mi. East of Lerma, Mexico, Mexico, August 30, 1958, 10,000 ft. (H. Howden); 3 males and 4 females, 10 mi. East of Toluca, Mexico, Mexico, July 31, 1954 (J. G. Chillcott), 8,900 ft.; 2 males and 1 female, same data as last preceding except August 17, 1954 and 8,600 ft.; 1 female, West side of Cortés Pass, Mexico, Mexico, August 13, 1954 (J. G. Chillcott), 9,500 ft. (CNC). Also, 1 male, Mexico, MB419 (A. Dampf); 2 females, 43 km. S. Mexico, September 5, 1939, 1,200 ft. (DeLong and Plummer); and 1 female, Río Frio, D. F., Mexico, October 18, 1941, K. 47 (DeLong, Good, Caldwell and Plummer) (DeLong collection, OSU).

The female second valvulae, not illustrated, are similar to the illustrations of *G. atropunctata* (Signoret) (fig. 721*k*). *G. psephana*, n. sp., resembles *G. consobrina* (Fowler) and its closely related species in general appearance, but the male pygofer of *psephena* is more produced and not as broad.

123. Genus PLUMMERELLA DeLong

Figures 733, 734

Plummerella DeLong, 1942b:200. Type-species: *Plummerella alpina* DeLong, by original designation and monotypy.

Plumerella DeLong, *loc. cit.* (incorrect original spelling).

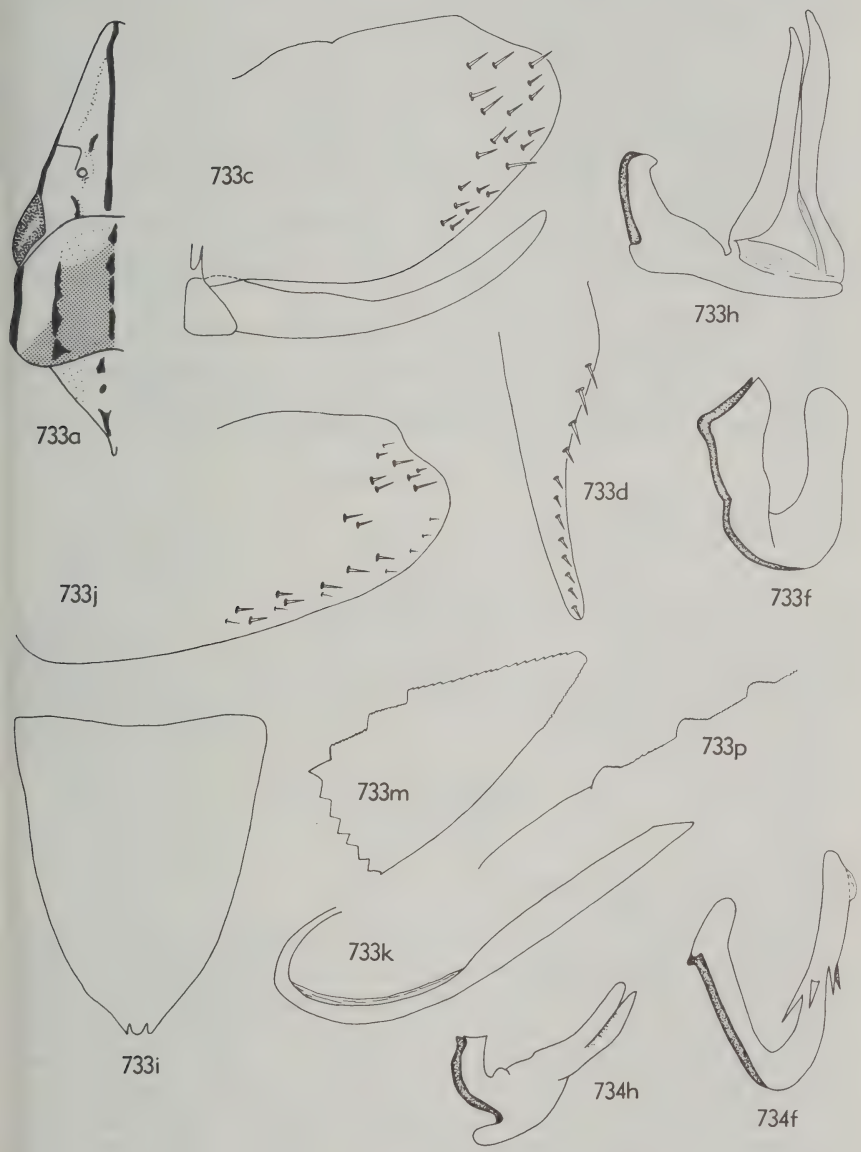
Length 7.2-8.0 mm.

Head very strongly produced and with anterior margin very narrowly rounded in dorsal view, median length of crown slightly greater than interocular width, and more than nine-tenths transocular width, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each ocellus slightly closer to median line than to adjacent anterior eye angle, crown convex to slightly flattened, with or without a transverse concavity across ocelli or before them; without a median fovea, surface finely sculptured with lenticular impressions, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical; median clypeal area with lenticular impressions, clypeus varying from rectilinear to slightly concave in profile, muscle impressions not distinct, transclypeal suture obsolete, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width slightly less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave, disk transversely rugose, not pubescent; scutellum transversely rugose or not behind transverse sulcus. Forewing with membrane involving only inner apical cell which may be partially or entirely membranous, veins not elevated, not very distinct, with three closed anteapical cells of which the bases are proximal to a transverse line through claval apex, with four apical cells of which the base of fourth is more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere less than combined length of two more distal tarsomeres and with two rows of small setae (the rows converging basally in some specimens) on plantar surface.

Male genitalia: Pygofer well produced, apex broadly convex, with a number of macrosetae located near posterior and posteroventral margins, pygofer processes absent. Plates slender, elongate, triangular, not extending posteriorly as far as pygofer apex, each with a single row of macrosetae. Style not extending posteriorly nearly as far as apex of connective, obliquely truncate apically, with preapical lobe occurring about midlength of shank. Connective elongate Y-shaped, the stem much longer than the arms and extending posteriorly almost one-third its length beyond apices of styles. Aedeagus with shaft fairly short, almost straight, with or without processes. Paraphyses asymmetrical.

Female abdominal sternum VII elongate, gradually tapered to apex which bears three small lobes. Genital chamber without sclerites. Ovipositor with second valvulae each broadened and toothed in slightly more than apical half,



FIGURES 733, 734.—733, *Plummerella alpina* DeLong (from specimen from Distrito Federal, Mexico; *h* from lateral view): *p*, Basalmost teeth of second valvula. 734, *P. lineata* DeLong, holotype (*h* from lateral view).

teeth sparse and rounded near base, angular more distally, each with a number of small denticles, apex acute, with a number of dorsal and ventral anteapical denticulations (from female of type-species).

Both of the known species of *Plummerella* were collected on grasses, at altitudes of 7,500 ft. (*P. lineata* DeLong) and 10,000 ft. (*P. alpina* DeLong), in the mountains near Mexico City and in Michoacán.

Plummerella DeLong belongs to the *Graphocephala* generic group (p. 849). The females (of *alpina* DeLong) have the pygofer and the abdominal sternum VII similar to most of the species in the complex, but the toothed area of the second valvulae is greatly reduced. The male genitalia do not have characters of diagnostic use at generic level. The elongate head and the occurrence of lenticular impressions of the median portion of the clypeus will serve to separate *Plummerella* from other genera of the group.

My interpretation of both species of *Plummerella* is based on a very few specimens, the holotype of *lineata* DeLong, a pair of paratypes of *alpina* DeLong, and a series of six specimens of the latter collected at Río Frio, D. F., Mexico, the type-locality, in the DeLong collection (OSU).

SPECIES OF *PLUMMERELLA*

alpina DeLong, 1942b:200. Mexico.
lineata DeLong, 1944b:68. Mexico.

KEY TO MALES OF *PLUMMERELLA*

Paraphyses more elongate, aedeagus without processes
alpina DeLong (fig. 733)
Paraphyses much more slender, aedeagus with five spines arranged in a circle near midlength of shaft ..... *lineata* DeLong (fig. 734)

124. NALTACA, NEW GENUS

FIGURE 735

Type-species: *Naltaca eremica*, n. sp.
Length of male 8.1-8.7 mm.

Head very strongly produced and with anterior margin narrowly rounded in dorsal view, median length of crown equal to or slightly greater than interocular width and from two-thirds to almost three-fourths transocular width, with a carina at median portion of transition from crown to face, ocelli located before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, surface of crown slightly convex from base to well beyond ocelli, flattened in approximately apical four-tenths of its length, the flattened portion limited posteriorly by a slight transverse elevation, surface rugulose and punctate, with some of the sculpturing in the form of lenticular impressions, lateral clypeal sutures not extending onto crown, median clypeal area without lenticular impressions; antennal ledges not protuberant, in lateral view with anterior margins almost vertical and slightly concave; clypeus concave in profile, muscle impressions distinct, transclypeal suture distinct, clypellus flattened, its surface in same plane as lora.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave, disk transversely rugose, not pubescent, scutellum transversely rugose behind transverse sulcus. Forewing with membrane including only inner apical cell, veins elevated and distinct, with three closed anteapical cells of which bases are either all proximal to claval apex, or with base of innermost opposite claval apex and outermost two more proximal, with venation at apex somewhat variable but in two of three available specimens delimiting four apical cells of which base of fourth is more proximal than base of third, with or without supernumerary crossveins near wing apex. Hindleg with femoral setal formula 2:1:0; length of first tarsomere slightly greater than combined length of two more distal tarsomeres and with two rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced and with an apicoventral lobe that is rolled mesad posteriorly, the relaxed (macerated) pygofer (fig. 735*c*) with an angular dorsal lobe, setae slender, located on posterior half of disk, processes absent. Plates slender, elongate, triangular, extending posteriorly

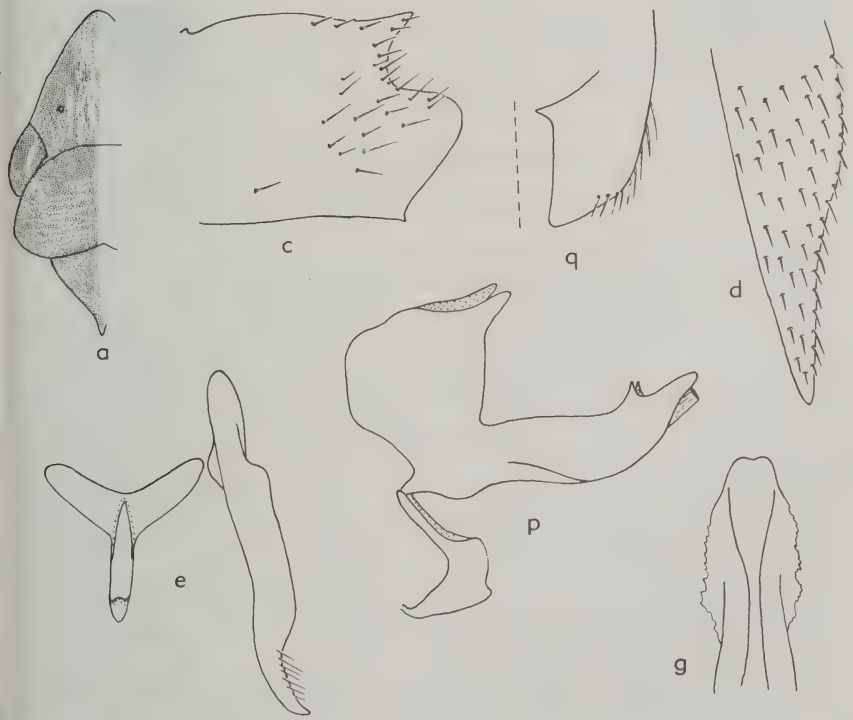


FIGURE 735.—*Naltaca eremica,* n. sp. (from specimen from Acatlán, Mexico; plate not shown in *c;* only aedeagal apex shown in *g*): *p,* Aedeagus and paraphyses, from lateral view; *q,* male pygofer, left side, from ventral view.

well beyond pygofer apex, each with numerous scattered microsetae. Style extending posteriorly beyond apex of connective, tapered and acute apically, without preapical lobe. Connective broadly Y-shaped. Aedeagus with shaft flattened and erose anteapically. Paraphyses inconspicuous, symmetrical.

Female unknown.

Naltaca is known only from the type-species, from the mountainous southern portion of the state of Puebla, Mexico. It is similar in appearance to specimens of *Plummerella* DeLong, but may be distinguished readily by the lateral clypeal sutures which do not extend onto the crown, by the 2:1:0 femoral setal formula of the hindlegs, the chaetotaxy of the male plate, and by the symmetrical paraphyses.

Naltaca eremica, NEW SPECIES

FIGURE 735

Structural characters as in generic description. Color of crown, pronotum, scutellum, and forewings, black, sparsely peppered with inconspicuous pale round dots; upper margin of face black, remainder pale; thoracic pleura black, legs yellow.

Holotype and one additional male, Puebla, Mexico, 3 miles northwest of Petlalcingo, March 4, 1972 (F. Parker and D. Miller) (USNM). One male, Acatlan, Mexico, February 19, 1954 (R. Dreisbach) (RD).

125. BARBINOLLA, NEW GENUS

FIGURES 736, 737

Type-species: *Tettigonia costaricensis* Distant.

Length of male 6.1-10.2 mm, of female 6.5-10.9 mm.

Head well produced, anterior margin bluntly subangular in dorsal view, without a carina at transition from crown to face, ocelli closer to median line of crown than to adjacent anterior eye angle, located on or behind a line between anterior eye angles (varying interspecifically), with area between ocelli flattened but not distinctly concave, without a median fovea, surface of disk longitudinally striate, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not or only slightly protuberant, in lateral view with anterior margins oblique and either convex or rectilinear (varying interspecifically); clypeus convex medially, muscle impressions distinct or not, without a lenticular sclerite bordering lateral clypeal suture on each side below eye, transclypeal suture obsolete medially, clypellus not produced, contour of its upper portion continuing profile of clypeus, its lower portion curved more strongly posteriorly, clypellar apex weakly pubescent.

Thorax with pronotal width equal to or greater than transocular width of head, lateral pronotal margins convergent anteriorly, dorsopleural carinae complete, disk transversely rugulose, not pubescent; scutellum transversely rugose or not behind transverse sulcus. Forewing with membrane including

only inner apical cell, veins distinct or not (venation as in *Graphocephala atropunctata* (Signoret) (fig. 721*r*); forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more apical tarsomeres and with two rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, posterior margin convex (except a slight posterodorsal concavity in *Barbinolla costaricensis* (Distant)), with a few macrosetae near posterior margin, without processes. Plates in lateral view each broad and flat in apical half, acute apically, extending farther

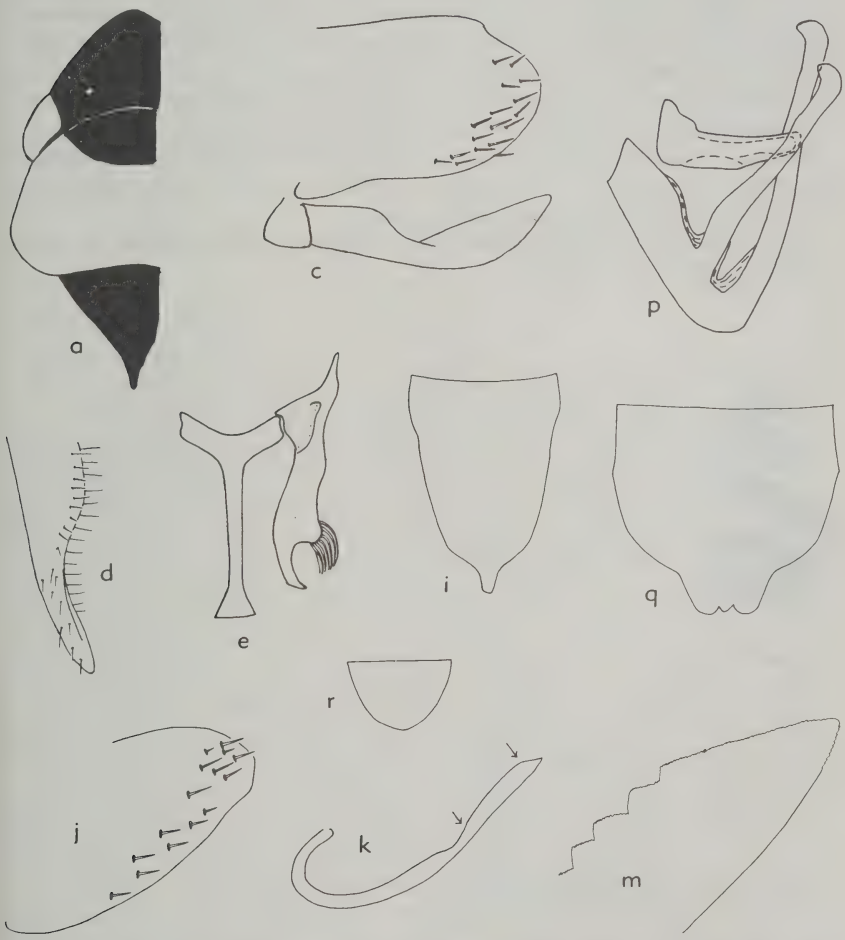


FIGURE 736.—*Barbinolla costaricensis* (Distant) (*a* from specimen from Panama; remainder from Costa Rica; *i* from dried specimen; arrows indicate extremities of toothed portion in *k*): *p*, Aedeagus and paraphyses, from lateral view; *q*, female abdominal sternum VII, from macerated specimen; *r*, dorsal sclerite of genital chamber, from dorsal view.

posteriorly than pygofer apex, with a number of microsetae and narrow macrosetae not in definite rows; style not extending posteriorly as far as apex of connective, with a definite preapical lobe that bears a beardlike tuft of setae, obliquely truncate at apex. Aedeagus slender, not elongate, without processes. Paraphyses asymmetrical in size and occurring in asymmetrical planes, but similar in form.

Female abdominal sternum VII well produced posteriorly, abruptly narrowed in apical half and with median portion truncate and trilobed apically (not readily apparent in dried specimens observed in ventral view). Genital chamber with a semioval sclerite in dorsal wall. Ovipositor not bearing dorsal teeth in region near basal curvature of second valvula, the primary teeth not very conspicuous except near apex, bearing secondary denticles, with anteapical posteroventral and posterodorsal denticles before acute apex. Pygofer moderately produced, with macrosetae near apex and continuing basiventrad near posteroventral margin.

Barbinolla occurs in Costa Rica and Panama. It is similar to *Graphocephala* Van Duzee in a number of characters, but differs markedly in the form of the tufted styles and in the broad male plates.

One specimen of *B. indignata* (Melichar) in USNM was collected on *Rubus* (blackberry), by W. Quesada.

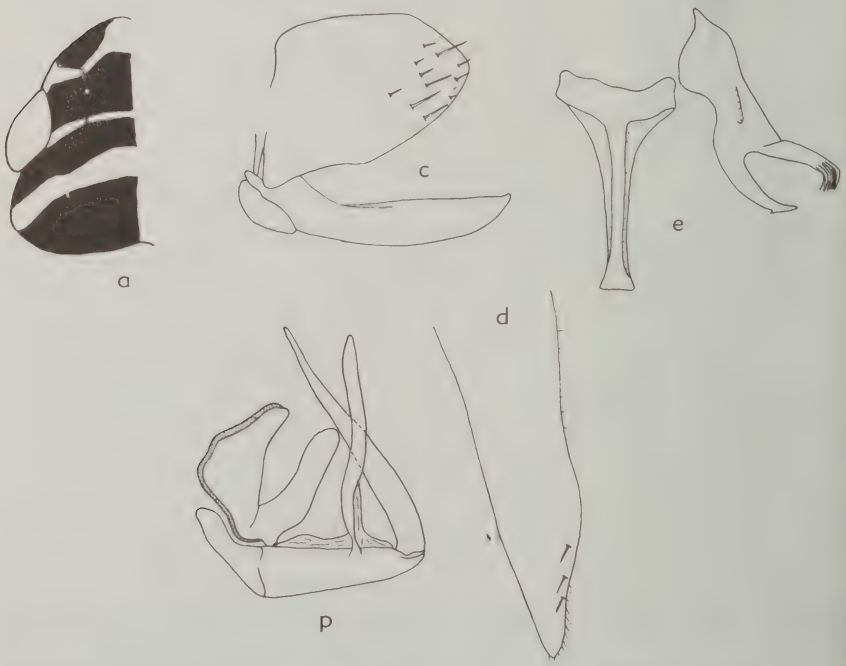


FIGURE 737.—*Barbinolla indignata* (Melichar) (from specimen from Costa Rica); *p*, Aedeagus and paraphyses, from lateral view.

My interpretation of *Tettigonia costaricensis* Distant is based on a study of the female lectotype; of *Microgoniella indignata* Melichar, on a specimen from MMB determined by Melichar.

SPECIES OF *BARBINOLLA*

costaricensis (Distant), 1879b:63 (*Tettigonia*). Costa Rica, Panama. New combination.
indignata (Melichar), 1951a:98 (*Microgoniella*). Costa Rica. New combination.

KEY TO SPECIES OF *BARBINOLLA*

Length 9.5-10.9 mm; color black with a yellow cincture extending over pronotum and part of face; male paraphyses cultrate apically in lateral view; female with dorsal margin of second valvulae toothed in apical one-third ..... *costaricensis* (Distant) (fig. 736)

Length 6.1-6.5 mm; color black and green without such a cincture; male paraphyses acute in lateral view; female with dorsal margin of second valvulae toothed in apical one-half ..... *indignata* (Melichar) (fig. 737)

126. CARIBOVIA, NEW GENUS

FIGURES 738-743

Type-species: *Tettigonia constans* Walker.

Length 6.0-8.0 mm.

Head moderately produced, anterior margin broadly rounded in dorsal view, median length of crown varying from six-tenths to slightly more than nine-tenths interocular width, and from one-third to slightly more than one-half transocular width, without a carina at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles and usually equidistant from median line of crown and adjacent anterior eye angle, crown with disk broadly and shallowly concave (exception: some specimens of *C. coffeeacola* (Dozier) in which the crown is slightly convex medially), without a median fovea, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant in lateral view, with anterior margins oblique and convex; face without a vertical lenticular suture bordering lateral clypeal suture on each side (exception: *C. lineata* (Osborn)), clypeus slightly flattened medially (with a clypeal protuberance at midlength in profile in *lineata*), muscle impressions not very distinct, transclypeal suture obsolete at middle, clypellus not produced, its profile continuing profile of clypeus (exception: *C. nesiotica*, n. sp.), bearing numerous small caducous setae.

Thorax with pronotal width equal to or less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete, posterior pronotal margin slightly concave, disk without sculpturing or pubescence; scutellum not transversely striate behind transverse sulcus. Forewing with membrane present (exception: *nesiotica*), variable in extent intraspecifically, with three closed anteapical cells, the relative positions of their bases variable interspecifically, with four apical cells, the base of the fourth usually not more proximal than base of third, without an anteapical plexus of

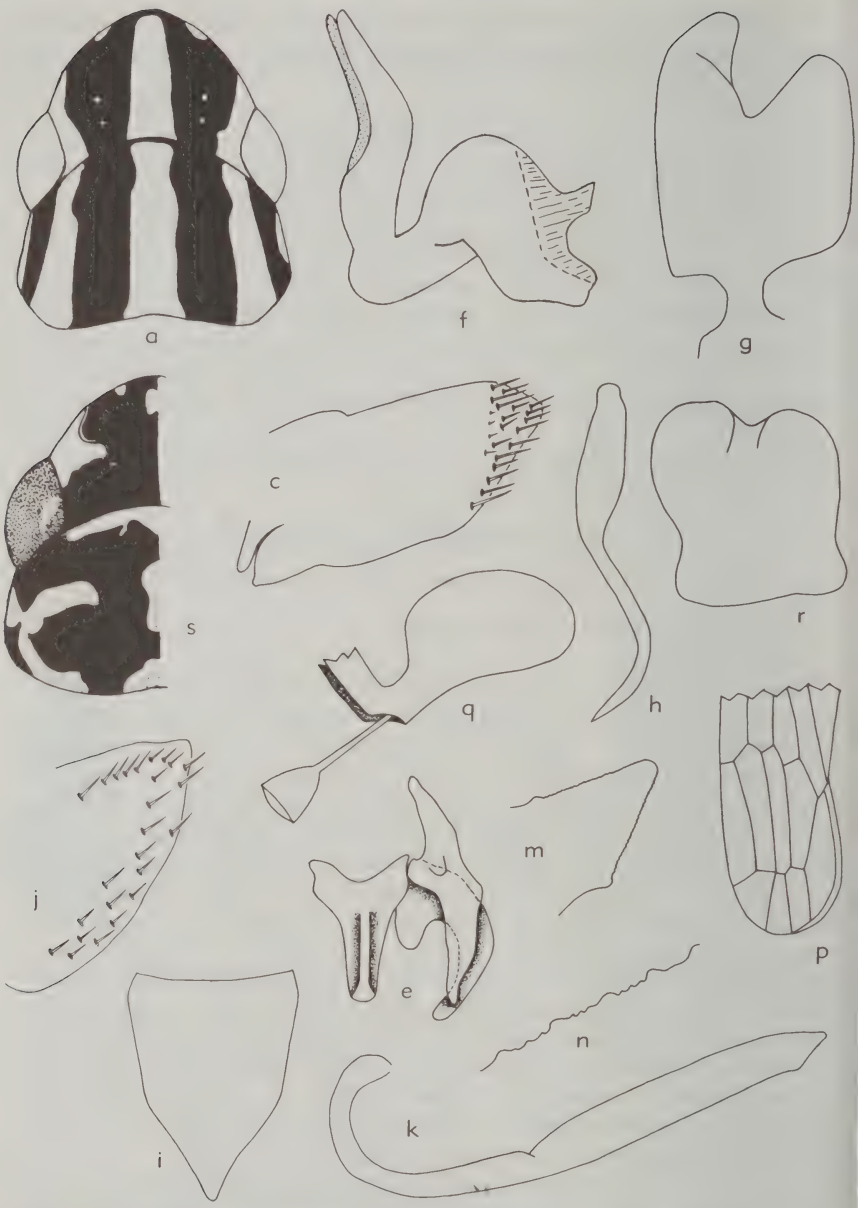


FIGURE 738.—*Caribovia constans* (Walker) (*a, f,* from specimen from Dominican Republic; *g, i-k, m, n,* from Provincia La Vega, Dominican Republic; *s* from Haiti; remainder from 8 miles up Macoris River, Dominican Republic; plate not shown in *c; h* from dorsal view): *p,* Apex of forewing; *q,* aedeagus from lateral view; *r,* aedeagal shaft from caudoventral view; *s,* anterior dorsum.

veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere varying interspecifically from slightly greater to much greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer well produced, apex varying interspecifically from acute to narrowly rounded, macrosetae confined to posterior half of disk and varying interspecifically from few to fairly numerous, pygofer processes absent. Plates elongate triangular, narrowed at midlength, extending posteriorly to a variable (interspecifically) degree in relation to pygofer, with a number of macrosetae in a single row (exception: *C. coffeeacola* (Dozier) which has additional macrosetae near base, most readily observed in macerated specimens). Style extending posteriorly a distance which varies interspecifically relative to apex of connective, without a preapical lobe, but in some species with an adjoining sclerotization which makes style appear biramous from its base. Connective with relative lengths of stem and arms variable. Aedeagus in lateral view much broader in apical than in basal half, or more slender and with shaft not decurved. Paraphysis unbranched, almost median, but asymmetrical because it does not lie entirely in median sagittal plane (exception: *nesiotica*, n. sp.).

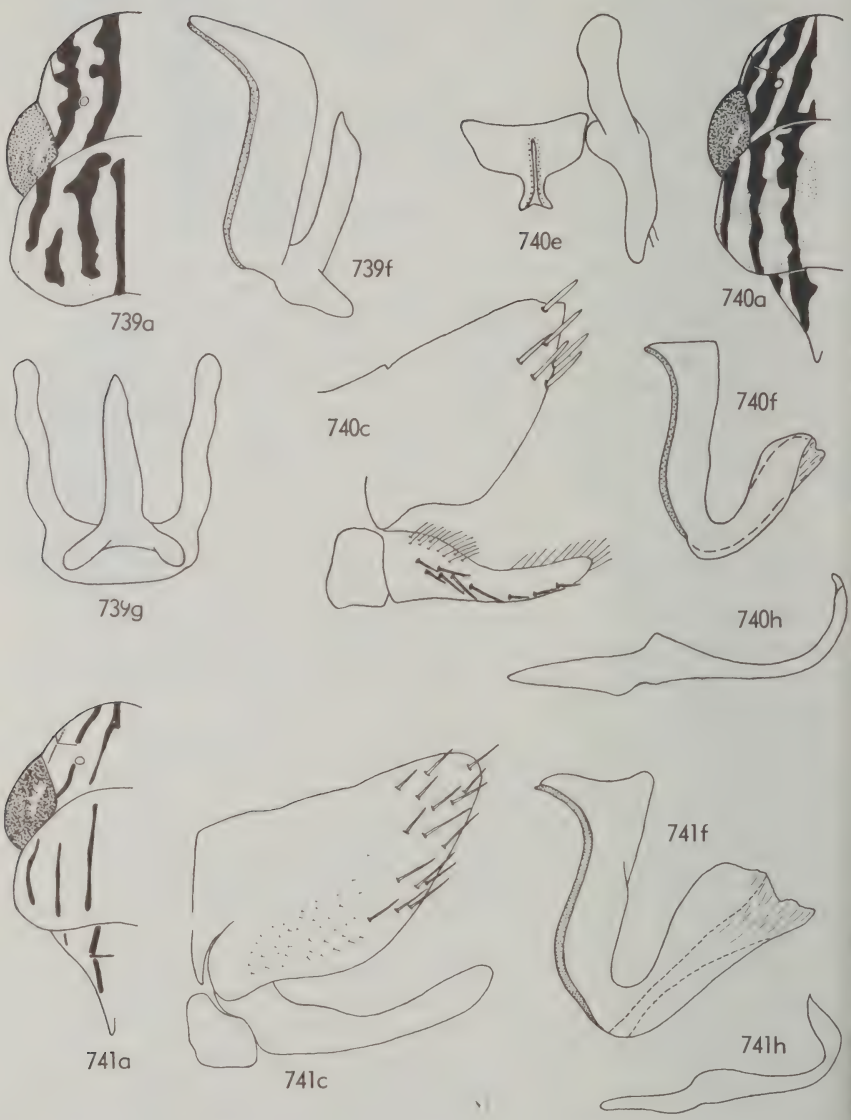
Female abdominal sternum VII strongly produced posteriorly and acutangular. Genital chamber without sclerites. Pygofer with macrosetae arranged in a narrow group parallel to dorsal margin. Ovipositor with second valvulae each broadened in apical two-thirds of portion beyond basal curvature and with well-spaced convexities and irregular small denticulations between them; apical portion narrowed acutely, with minute anteapical dorsal and ventral denticulations.

Specimens of *Caribovia* vary interspecifically and intraspecifically in color and markings. Several species have a pattern of black markings on thorax and crown suggestive of species *Sibovia* China.

The genus *Caribovia* is confined to the West Indies. *Caribovia* is similar to *Graphocephala* Van Duzee and its relatives in several respects, for example wing venation and asymmetry of paraphyses, and the female genitalia are similar to those of *Barbinolla*, new genus. It differs from *Graphocephala* and closely related genera in lacking lenticular pits on the crown.

I have seen *C. constans* (Walker) collected on globe artichoke and on *Buddleia verbascifolia* H. B. and K. in Haiti. Martorell (*in* Caldwell and Martorell 1952a:6) reported *C. coffeeaphila* (Dozier) from throughout Puerto Rico at approximate altitudes where coffee is normally grown, but his records do not include coffee as a host plant. I have seen specimens of *C. coffeeacola* (Dozier) collected by R. G. Oakley on coffee leaves in Ponce, Puerto Rico. Martorell (*op. cit.*, p. 8) reported *coffeeacola* from a variety of plants, and nymphs from *Rubus rosaefolius* Smith in Puerto Rico, but believes that the leafhoppers breed on a variety of plants.

My interpretations of *C. coffeeacola* (Dozier) and *C. coffeeaphila* (Dozier) are based on male allotypes (figs. 740 and 739) of these species. Caldwell's interpretation (*in* Caldwell and Martorell (see reference above)) is the same. My



FIGURES 739-741.—739, *Caribovia coffeeaphila* (Dozier) (from specimen from El Yunque, Puerto Rico). 740, *C. coffeeacola* (Dozier) (from specimen from Mayagüez, Puerto Rico; *h* from lateral view). 741, *C. lineata* (Osborn) (from specimen from El Yunque, Puerto Rico; *h* from lateral view).

interpretation of the typical variety of *Tettigonia constans* Walker is based on a study of the holotype. It is marked as in the present illustration of the variety marked with longitudinal lines on crown and pronotum (fig. 738*a*). My interpretation of *Hortensia gundlachiana* Metcalf and Bruner is based on the holotype and allotype (male) in NCS. The present interpretation of *Entogonia lineata* Osborn is based on a study of the lectotype (fig. 741).

I have studied only the female holotype of *Tettigonia intensa* Walker. From a sketch I made of the specimen, it seems close to *Caribovia coffeeacola* (Dozier) and possibly will preempt the latter. Males from Jamaica, Walker's type-locality, are needed to decide this question.

SPECIES OF *CARIBOVIA*

coffeeacola (Dozier), 1927b:264 (*Cicadella*). Puerto Rico. New combination.
coffeeaphila (Dozier), 1927b:263 (*Cicadella*). Puerto Rico. New combination.
constans (Walker), 1858b:198 (*Tettigonia*). Cuba, Dominican Republic, Haiti. New combination.
gundlachiana (Metcalf and Bruner), 1936a:930 (*Hortensia*). New synonymy.
glabra, n. sp. Dominican Republic.
intensa (Walker), 1851b:767 (*Tettigonia*). Jamaica. New combination.
lineata (Osborn), 1935a:136 (*Entogonia*). Puerto Rico. New combination.
nesiotica, n. sp. Dominican Republic.

KEY TO SPECIES OF *CARIBOVIA*

(*C. intensa* (Walker) not included)

1. Crown with markings in form of longitudinal or diagonal black lines 2
   Crown without such lines 5
2. Median line of crown entirely pale, or pale except at apical margin 3
   Median line of crown with more dark markings than above 4
3. Pronotum with median line pale ..... *constans* (Walker) (fig. 738)
   Pronotum with a median black line ..... *coffeeaphila* (Dozier) (fig. 739)
4. Clypellus with a median black line, head more strongly produced *coffeeacola* (Dozier) (fig. 740)
   Clypellus pale, head less strongly produced ..... *lineata* (Osborn) (fig. 741)
5. Crown and face shining black, unmarked 6
   Crown and face with pale markings ..... *constans* (Walker) (fig. 738)
6. Forewings without longitudinal markings ..... *glabra*, n. sp.
   Forewings with longitudinal blue markings ..... *nesiotica*, n. sp., page 914

Caribovia glabra, NEW SPECIES

FIGURE 742, PAGE 915

Length of male 6.0 mm, of female 6.4 mm. Head with median length of crown nine-tenths or more interocular width and approximately one-half transocular width, ocelli slightly behind a line between anterior eye angles. Thorax with pronotal width less than transocular width of head, lateral

margins parallel; forewing with inner apical cell mostly membranous (female with translucent areole in each of third and fourth apical cells also); anteapical cells with bases approximately in same transverse line, all located more basally than apex of clavus; base of fourth apical cell a continuation of base of third; length of first posterior tarsomere distinctly greater than combined length of two more distal tarsomeres. Male with pygofer subangulate apically, macrosetae very elongate; plates extending posteriorly beyond pygofer apex; style extending posteriorly as far as apex of connective; connective with arms much shorter than stem; aedeagus in lateral view gradually broader in apical half, with apex truncate. Other structural characters as in generic description.

Color of face, anterior dorsum and forewings black, the last suffused with brown; a spot in claval apex of female, and spots at apices of anteapical cells of both sexes, red; a hyaline costal spot opposite base of outer apical cell; legs yellow, venter of thorax black.

Holotype male and one male with genitalia lost, and one female, Colonia Ranfis, Prov. Trujillo, Dominican Republic, December 26, 1955 (J. Maldonado Capriles) (USNM).

C. glabra, n. sp., is slightly smaller than other species in the genus, and the only species which does not have longitudinal stripes on the forewings.

Caribovia nesiotica, NEW SPECIES

FIGURE 743, PAGE 915

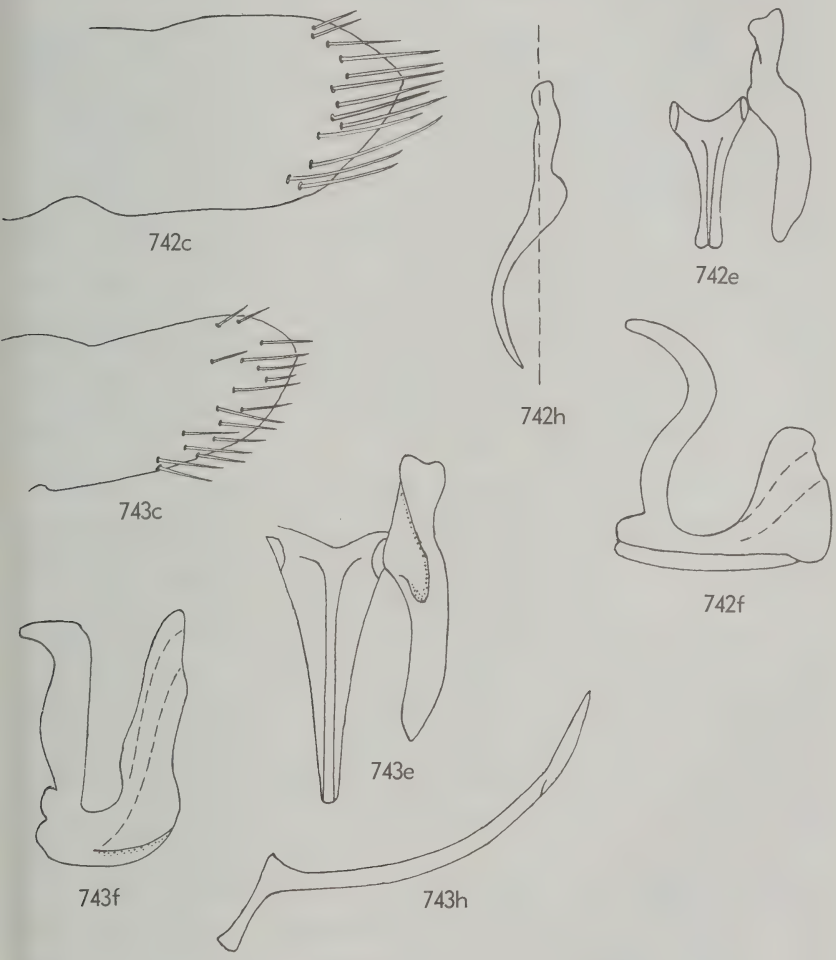
Length of male 6.9-7.0 mm. Head with median length of crown six-tenths interocular width and approximately one-third transocular width, contour of lower portion of clypellus slightly more nearly horizontal than profile of remainder of face. Thorax with pronotal width slightly less than transocular width of head, lateral margins parallel; forewing without a membrane; anteapical cells with bases located more basally than claval apex; base of fourth apical cell more proximal than base of third; length of first posterior tarsomere slightly greater than combined length of two more distal tarsomeres. Male with pygofer convex apically; plates not extending posteriorly as far as pygofer apex; style not extending posteriorly as far as apex of connective; connective with arms much shorter than stem; aedeagus in lateral view not broadened apically, apex not truncate; paraphysis median. Other structural characters as in generic description.

Color of dorsum including forewings shining black, forewings with a diagonal claval stripe bordering claval suture, a parallel stripe on corium and a small spot laterad of apex of latter, blue, a slender transverse stripe extending from costal margin across anteapical cells to margin of inner apical cell, ivory tinged with blue; face and thoracic pleura shining black, legs yellow.

Holotype male, Paso de la Vaca, Mons. Nouel - Constanza Rd., Prov. La Vega, Dominican Republic, alt. 1,500 m., December 27, 1955 (J. Maldonado

Capriles); and one male, Valle Nuevo, Prov. La Vega, Dominican Republic, 1,500 m., December 28, 1955 (J. Maldonado Capriles) (USNM).

C. nesiotica, n. sp., may be distinguished readily from other species of the genus by the median paraphysis, and by the distinctive color pattern.



FIGURES 742, 743.—742, *Caribovia glabra*, n. sp., from male topotype (plate not shown in *c; h* from ventral view). 743, *C. nesiotica*, n. sp. (from specimen from Valle Nuevo, Dominican Republic; plate not shown in *c; h* from lateral view).

127. Genus APOGONALIA Evans

Figures 744-761

Apogonia Melichar, 1926a:344. Type-species: *Tettigonia stali* Signoret, by subsequent designation of China, 1938d:184 (preoccupied).

Apogonalia Evans, 1947a:159 (new name).

Colimona Oman, 1949a:71. Type-species: (*Tettigonia monticola* Fowler, misdetermination) = *Apogonalia omani*, new species, described below. New synonymy.

Length 5.8-9.0 mm.

Head varying from moderately conically produced, to only slightly produced and with anterior margin broadly rounded in dorsal view, median length of crown varying from four-tenths to more than eight-tenths interocular width, and from one-fifth to more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on, before, or behind a line between anterior eye angles, each ocellus equidistant from adjacent anterior eye angle and median line of crown or slightly closer to former, crown convex and without a transverse concavity across ocelli, without a median fovea and without sculpturing or granular or punctate, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical or oblique, often slightly concave; face with a vertical lenticular sclerite bordering lateral clypeal suture on each side, below eye (absent in an undescribed species from Dominican Republic), clypeus varying from convex to slightly flattened medially, muscle impressions distinct or not, transclypeal suture obsolete at middle, clypellus not produced, its contour continuing profile of clypeus, or slightly more nearly horizontal in its lower portion (*A. pinguis*, n. sp.).

Thorax with pronotal width less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural carinae complete or nearly so, posterior margin concave, disk transversely rugulose or not, not pubescent; scutellum transversely striate or not behind transverse sulcus. Forewing with membrane (occasionally partly or entirely fumose) usually including all of apical cells, veins not elevated, distinct or not, with three closed anteapical cells, of which the base of the middle one is located more distally than base of either adjoining anteapical cell, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins (occasionally with one or two supernumerary crossveins in central anteapical cell); forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:0; length of first tarsomere equal to or greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface, with small setae between the rows basally in some species.

Male genitalia: Pygofer moderately produced, apex variable interspecifically, from obliquely truncate or broadly convex to slightly concave, with few to many macrosetae located parallel to posterior margin or to posterior and posteroventral margins, pygofer processes present or absent. Plates triangular, not extending posteriorly as far as pygofer apex (exception: *A. woodruffi*, n. sp.) with uniseriate or irregularly biseriate macrosetae arranged longitudinally (exception: *woodruffi*). Style extending posteriorly as far as apex of connective

or not, usually truncate apically, with lateral lobe (occurring as far anteriorly as articulation with connective in *A. germana* (Fowler)). Aedeagus with shaft very short, straight or curved, with or without processes, dorsal apodemes usually conspicuous and widely divergent. Paraphyses variable interspecifically and to some extent intraspecifically.

Female abdominal sternum VII usually moderately elongate (exception: *A. omani*, n. sp.), with posterolateral margins oblique, the apex angular or slightly notched. Genital chamber usually with a median sclerite. Ovipositor with second valvulae narrow at bases, each expanded beyond basal curvature and with large dorsal quadrate teeth, not extending quite to acute or strongly convex apex, with minute secondaries on the primary teeth and with minute anteapical denticulations on dorsal and posteroventral margins.

Species of *Apogonalia* Evans can be placed into three groups; first, those in which the head is conically produced, and in which the aedeagus bears one or more processes which are directed ventrally; second, those species in which the aedeagus is as in the preceding group, but in which the head is broader and nearly parallel-margined; and third a group in which the head is much as the second group but with the aedeagus devoid of processes and curved slightly posterodorsally. The species Oman (1949a:71) included in *Colimona* belong in the first group; *A. histrio* (Fabricius), *A. robusta* (Walker), *A. pinguis*, n. sp., and *A. sanguinipes* (Van Duzee) belong in the second group; and *A. stali* (Signoret) belongs in the third group of species. The form of the anteapical cells (fig. 744*q*) is a diagnostic character for the genus and is common to all three groups.

Species of *Apogonalia* Evans have been studied from localities from Arizona to Costa Rica and from Cuba, Haiti, the Dominican Republic, and Jamaica. *Apogonalia* Evans is similar to *Macugonalia*, new genus, and to *Hadria* Metcalf and Bruner. From both of these genera, *Apogonalia* may be separated readily by the form of the anteapical cells of the forewing.

Oman, in the original description of *Colimona* selected as type-species, "specimens in the United States National Museum, from the Santa Rita Mountains in Arizona, which I identify as *Tettigonia monticola* Fowler, 1899." A male of this species (fig. 757) has been dissected, as has the lectotype (fig. 760) of *Tettigonia monticola* Fowler (the pygofer and processes of the latter, not illustrated here, are closely similar to the illustrations of these structures in *A. blanchardi* (Signoret)). The species Oman considered to be *monticola* is described below, as *A. omani*, n. sp.

Very little is known about the biology of species of *Apogonalia*. There are two specimens of *A. fractinota* (Fowler) in ZIMH from lemon in Costa Rica. *A. krameri*, n. sp., and *A. sanguinipes* (Van Duzee) have been taken on *Lantana camara* L., and the former has been intercepted on leaves of mango. *A. histrio* (Fabricius) has been taken on sugarcane in Cuba. *A. imitatrix*, n. sp., has been taken on "*Caesaria*" (= *Viviania*?) *hirsuta* [Knuth] in Cuba, *A. robusta* (Walker) has been collected from *Coffee arabica* L. in Cuba, and on yam, almond, and cotton in Puerto Rico.

My interpretation of *Tettigonia blanchardi* Signoret is based on specimens compared with drawings of the head of the female lectotype. A specimen I

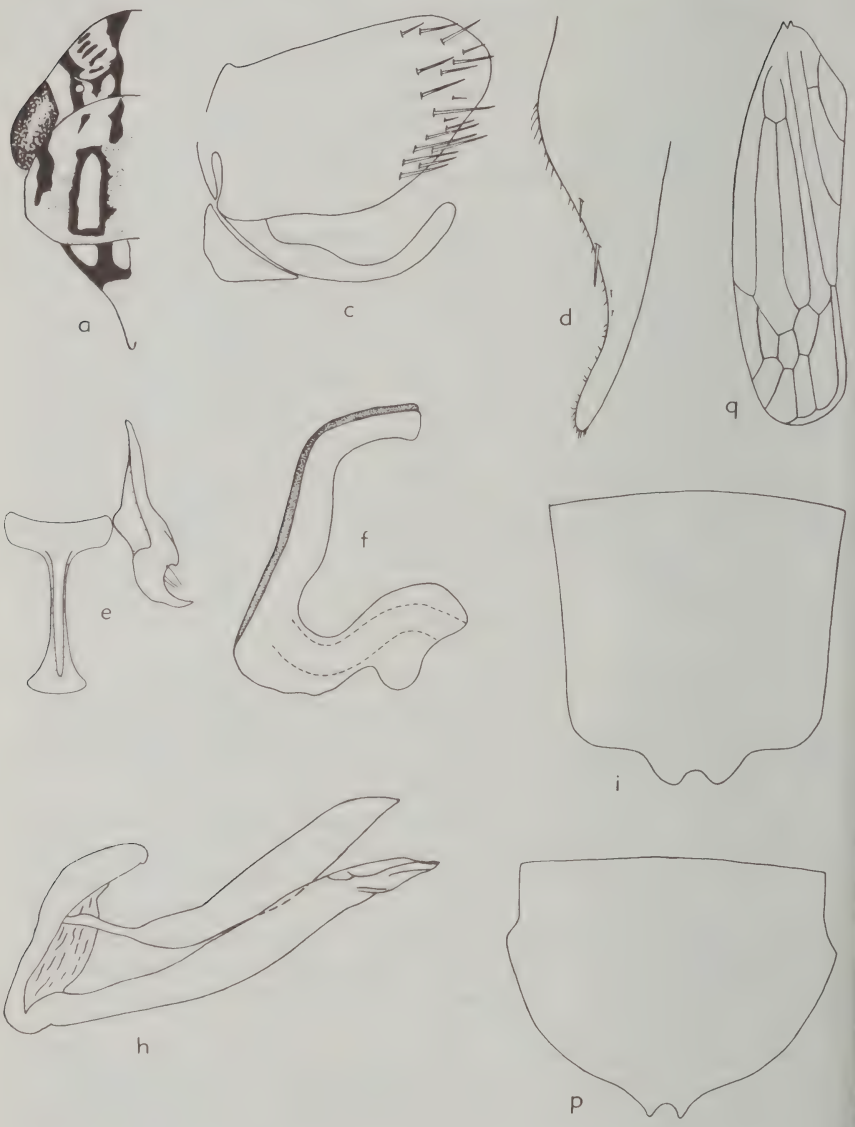


FIGURE 744.—*Apogonalia stali* (Signoret) (*a* from specimen from Honduras; *h* from Mexican specimen intercepted in Texas; *i* from lectotype, not macerated; *p*, *q*, from Mérida, Mexico; remainder from Mexico; *h* from lateral view): *p*, Female abdominal sternum VII, macerated, from ventral view; *q*, forewing.

compared with the lectotype of *T. granulata* Walker is conspecific with *blanchardi*. *T. fractinota* Fowler is presently interpreted in the sense of a male, from the type-series, from Teapa, Tabasco, Mexico, which was dissected and compared with the illustrations published here. *T. albidonotata* Fowler is synonymized with the preceding, because the male genitalia of the lectotype of *albidonotata* are also similar to the illustrations of *fractinota* published here. The two forms are readily separable externally on the basis of color pattern, and perhaps eventually the junior name (by page priority) will be resurrected.

The male genitalia of a specimen compared with the female lectotype of *Tettigonia germana* Fowler agree well with the illustrations of the specimen from Jalapa, Vera Cruz, published here. The lectotype of *Cicada histrio* Fabricius, a damaged female, has markings which agree fairly well with the present interpretation of this species, and with Metcalf and Bruner's (1936a, plate III, figure 3) interpretation. *Poeciloscarta histrio* var. *baraguensis* (Metcalf and Bruner), quite different in appearance, has identical male genitalia.

I have interpreted *Apogonalia interrupta* (Signoret) on the basis of the original illustration which agrees with specimens at hand from the Dominican Republic and Jamaica. I found no specimens of this species in Signoret's collections in Europe.

The male genitalia of the lectotype of *Tettigonia mediolineata* Fowler agree with the illustrations published here. *T. fausta* Walker and *Poeciloscarta laticeps* Metcalf and Bruner are placed in synonymy under *robusta* (Walker) as a result of a comparison of the anterior dorsum of each of the female holotypes of the Walker nominal species with the figure published here, and a study of the type-series of *laticeps* (it should be noted however, that I have not yet seen a specimen of *robusta* other than the holotype, from the Dominican Republic, the type-locality of *fausta*).

My interpretation of *Tettigonia histrio* var. *sanguinipes* Van Duzee rests on paratypes of this species, from Jamaica, in CAS. My interpretation of *T. stali* Signoret agrees with the female lectotype in NMV, which bore both Signoret and Fowler determination labels, and with other male specimens determined by Melichar.

SPECIES OF *APOGONALIA*

blanchardi (Signoret), 1855d:788 (*Tettigonia*). Central and S. Mexico, Guatemala.
  granulata (Walker), 1858b:195 (*Tettigonia*). New synonymy.
dampfi, n. sp. S. Mexico, Guatemala, Costa Rica.
fractinota (Fowler), 1899d:246 (*Tettigonia stali* var.) S. Mexico, Guatemala, Br. Honduras, Honduras, Nicaragua, Costa Rica, Panama.
  albidonotata (Fowler), 1899e:250 (*Tettigonia*). New synonymy.
fraterna, n. sp. Central Mexico.
germana (Fowler), 1899d:242 (*Tettigonia*). Central and S. Mexico. New combination.
histrio (Fabricius), 1794a:34 (*Cicada*). Cuba, Puerto Rico, Haiti. New combination.
  histrio var. *baraguensis* (Metcalf and Bruner), 1936a:937 (*Poeciloscarta*).
imitatrix, n. sp. Cuba.
interrupta (Signoret), 1855d:785 (*Tettigonia*). Haiti, Dominican Republic. New combination.
krameri, n. sp. NW., central and S. Mexico, El Salvador, Honduras.
mediolineata (Fowler), 1899d:244 (*Tettigonia*). Central and S. Mexico. New combination.

monticola (Fowler), 1899d:244 (*Tettigonia*). S. Mexico. New combination.
omani, n. sp. Arizona.
pinguis, n. sp. Haiti, Dominican Republic.
robusta (Walker), 1851b:777 (*Tettigonia*). Bahamas, Puerto Rico, Cuba, Dominican Republic. New combination.
fausta (Walker), 1858b:198 (*Tettigonia*). New synonymy.
laticeps (Metcalf and Bruner), 1936a:940 (*Poeciloscarta*). New synonymy.
sanguinipes (Van Duzee), 1907a:59 (*Tettigonia histrio* var.). Cuba, Jamaica. New combination.
stali (Signoret), 1855d:787 (*Tettigonia*). NW., central and S. Mexico, Guatemala, Honduras, Nicaragua, El Salvador, Costa Rica.
woodruffi, n. sp. S. Mexico, Guatemala.

KEY TO MALES OF *APOGONALIA*

1. Aedeagus without processes 2
   Aedeagus with one or more ventral processes 3
2. Pygofer with posteroventral margin emarginate (fig. 745)
   imitatrix, n. sp., page 924
   Pygofer with posteroventral margin regularly rounded
   stali (Signoret) (fig. 744)
3. Paraphyses with both arms conspicuously forked
   sanguinipes (Van Duzee) (fig. 746)
   Paraphyses with arms not forked 4

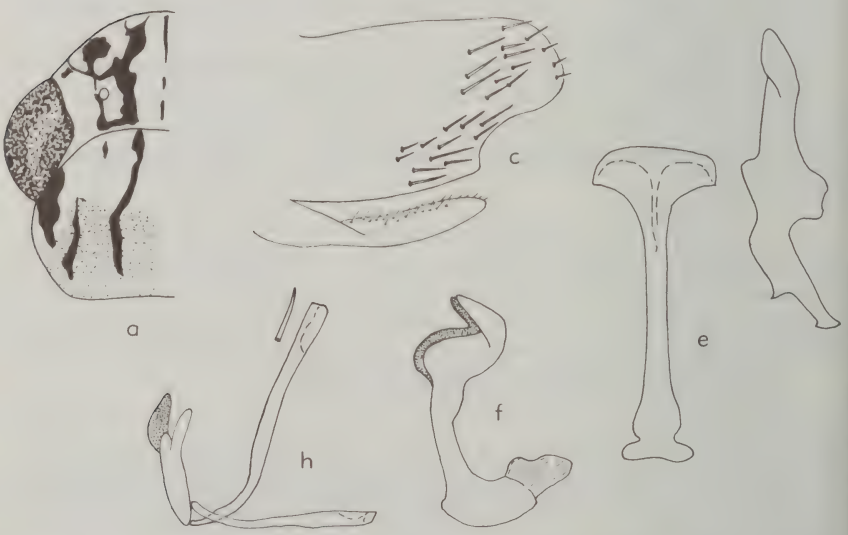


FIGURE 745.—*Apogonalia imitatrix*, n. sp. (from specimen from Oriente Province, Cuba; sternum IX not shown in *c;* style and connective separated in *e; h* from lateral view, dorsal ramus broken off).

4. Color of crown yellow or greenish yellow, with an apical corona of six black spots (fig. 748*a*) 5
   Not marked as above 6

5. Aedeagus very short, with dorsal margin strongly convex; paraphyses symmetrical (fig. 747) ..... *pinguis*, n. sp., page 925
   Aedeagus longer, with dorsal margin mostly concave; paraphyses asymmetrical ..... *interrupta* (Signoret) (fig. 748)

6. Pygofer with a pair of processes on or near apex on each side 7
   Pygofer with only a single apical process on each side or without processes 8

7. Pygofer processes of each side approximately of equal length, directed mesally and usually crossing midline ..... *krameri*, n. sp., page 927
   Pygofer processes of each side unequal in length, neither crossing midline, the more apical one curving posteriorly and parallel to its counterpart on the other side of the pygofer ..... *dampfi*, n. sp., page 931

8. Pygofer with apex concave and pronotum with median line pale 9
   Without above combination of characters 10

9. Median pronotal line continued almost to apex of crown; aedeagus in lateral view with paired ventral processes arising at base of shaft *mediolineata* (Fowler) (fig. 751)
   Median pronotal line not or scarcely continued on crown; aedeagus in lateral view without paired ventral processes, with a conspicuous unpaired apical process directed ventrally (fig. 752) *fraterna*, n. sp., page 935

10. Crown with median black line extending almost full length *blanchardi* (Signoret) (fig. 753)
    Crown without a median black line, or if present very narrow and not extending to apex 11

11. Pygofer in caudoventral view without a sclerotized process or angular processlike structure ..... *germana* (Fowler) (figs. 754, 755)
    Pygofer in caudoventral view with a sclerotized process or an angular processlike structure 12

12. Forewing with three conspicuous white or orange (occasionally confluent) spots in clavus ..... *fractinota* (Fowler) (fig. 756)
    Forewing with spots smaller, more numerous, or absent 13

13. Pygofer with only a few macrosetae, located parallel to apical margin; paraphyses represented by a greatly reduced Y-shaped sclerite (fig. 757*h*) ..... *omani*, n. sp., page 937
    Pygofer with macrosetae much more numerous, located parallel to posterior and posteroventral margins (figs. 758*c* and 759*c*); paraphyses with at least one elongate slender arm (figs. 758*h* and 759*h*) 14

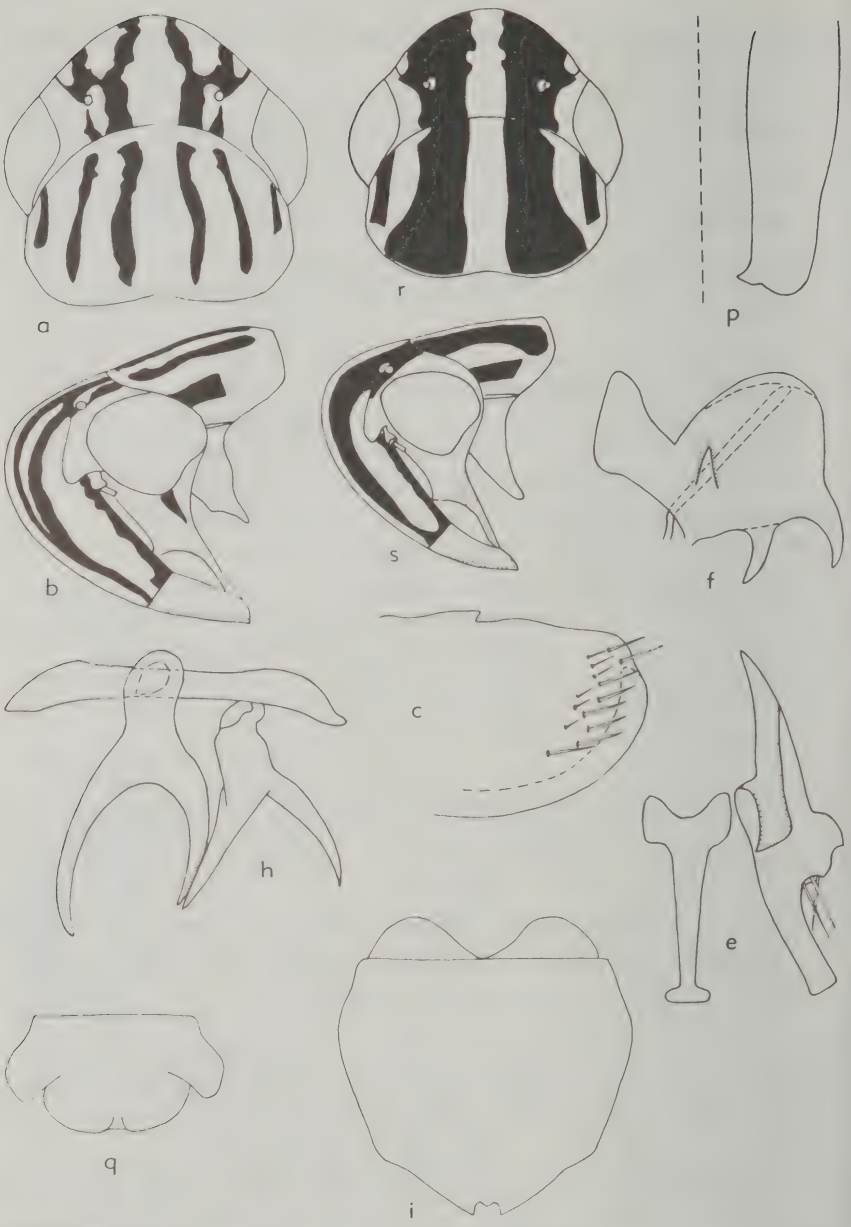


FIGURE 746.—*Apogonalia sanguinipes* (Van Duzee) (*a*, *b*, from specimen from St. Andrews, Jamaica; *i*, *p*, *q*, from Mandeville, Jamaica; *r*, *s*, from St. Mary, Jamaica; remainder from Kingston, Jamaica; microsetae and plate not shown in *c*; *h* from dorsal view): *p*, Male pygofer, left side, from ventral view; *q*, sclerotization of genital chamber, from anterodorsal view; *r*, anterior dorsum; *s*, head and pronotum, from lateral view.

14. Head very short and broad, median line of crown and pronotum broadly yellow on each side of very narrow median black center 15
Head longer, conical, median line of crown and pronotum not yellow 16

15. Aedeagus with broad angular lateral protuberance near base of shaft, ventral processes joined very broadly to shaft
histrio (Fabricius) (fig. 758)
Aedeagus with narrow lateral protuberance along dorsal margin of shaft, ventral processes more narrowly joined to shaft
robusta (Walker) (fig. 759)

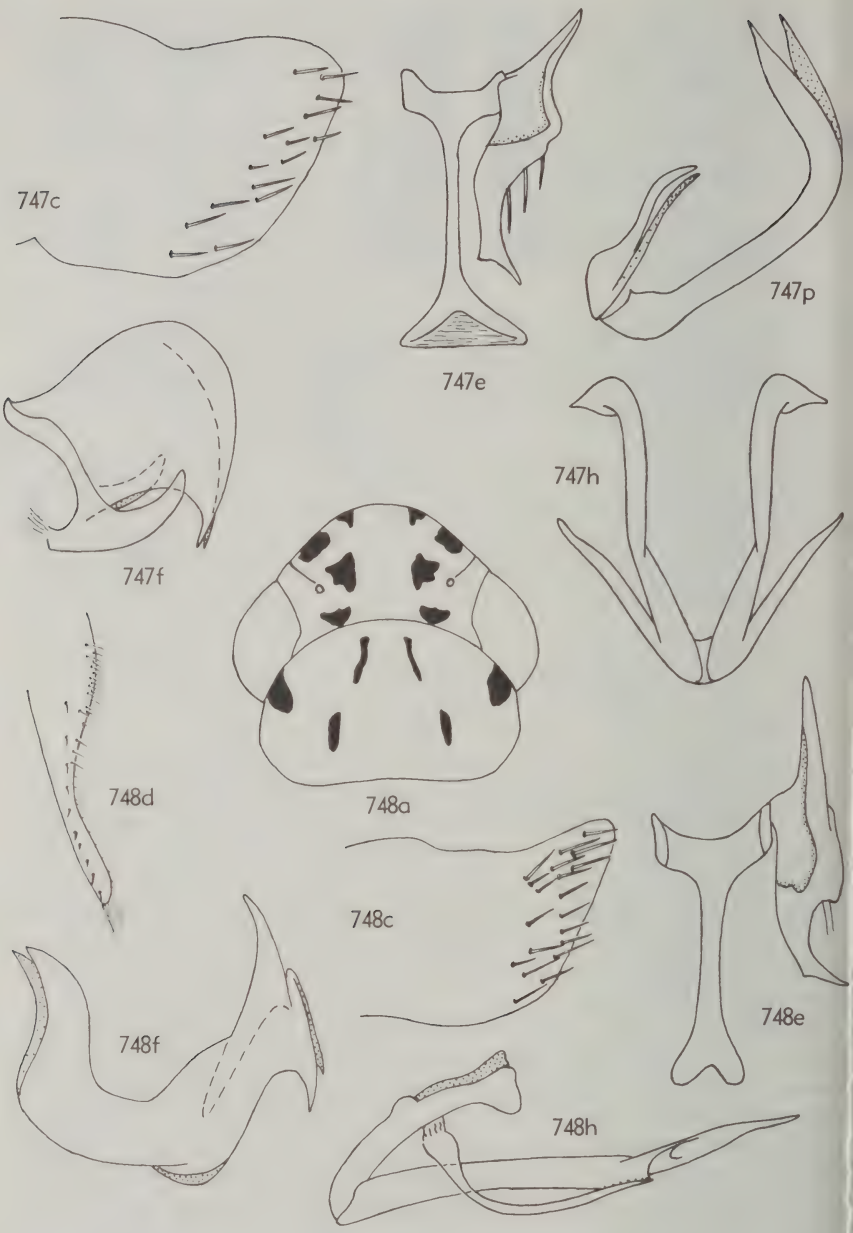
16. Aedeagus in lateral view with shaft broader and curved slightly dorsally (fig. 760*f*); pygofer processes in caudoventral view short, not attaining median line and similar to those of *blanchardi* (fig. 753*p*); forewing with large white markings on disk of corium
monticola (Fowler) (fig. 760)
Aedeagus in lateral view with shaft narrow, not curved (fig. 761*f*); pygofer processes in caudoventral view slender and more elongate, attaining or crossing median line (fig. 761*p*); corial markings consisting of dots, and occasionally of larger white markings near and parallel to costal margin ..... *woodruffi*, n. sp., page 939

Apogonalia imitatrix, NEW SPECIES

FIGURE 745, PAGE 920

Length of male 5.7-6.0 mm, of female 5.6-5.9 mm. Head with median length of crown varying from slightly more than four-tenths to slightly more than six-tenths interocular width and from one-fourth to slightly more than one-third transocular width; antennal ledges with anterior margins rectilinear and vertical in lateral view; clypeus broadly convex, not flattened medially, muscle impressions distinct. Pronotum with posterior portion not transversely striate; scutellum without transverse striae behind transverse sulcus; forewing with membrane including all of apical cells except basal portion of fourth; veins distinct. Male pygofer with apex strongly convex, posteroventral margin concave, with a number of macrosetae arranged in anteapical diagonal group, and a few located submarginally near posterodorsal margin; plate with numerous dispersed microsetae and a few uniseriate macrosetae in apical half; style not extending posteriorly nearly as far as apex of connective, with an anteapical mesal angular tooth, apex obliquely truncate; aedeagus without processes, with shaft very short, curved slightly posterodorsally; paraphyses with the two arms arising at asymmetrical locations from base, which is median.

Color of crown, pronotum, and scutellum yellowish tan, disk of pronotum somewhat darker; crown with median line (often incompletely) narrowly black, with a semicircular black areole on each side of apical margin, partly enclosing a black spot and giving off two narrow parallel black stripes that extend posteromesally to the basal margin, thus forming a narrow rectangular



FIGURES 747, 748.—747, *Apogonalia pinguis*, n. sp., holotype (plate not shown in *c; h* from caudoventral view): *p*, Paraphyses from lateral view. 748, *A. interrupta* (Signoret) (from specimen from Dominican Republic (plate and microsetae not shown in *c; h* from lateral view).

area on each side with the ocellus at its anterior end. Pronotum with a longitudinal vitta behind each eye, a pair of median longitudinal black stripes which are slightly divergent behind midlength, sometimes interrupted, and failing to attain posterior pronotal margin, and occasionally with a small black spot near anterior margin more laterally than median lines, and/or a narrow oblique slightly diagonal black line on each side extending anteromesally from humeral margin; scutellum with a pair of short longitudinal black markings before transverse sulcus; forewing with costal, brachial, and inner and outer claval cells tan, the inner claval occasionally yellowish near commissural wing margin; middle anteapical cell and remainder of corium (except membrane) purple with darker purple markings along longitudinal veins, the paler purple often in form of three corial spots; face yellow with a narrow W-shaped marking on the clypeus, extremities of transclypeal suture and median portion of clypellus, black; thoracic pleura yellow, marked with black; legs sordid yellow.

Holotype male, Nagua, Oriente, Cuba, July 29, 1922 (S. C. Bruner and C. H. Ballou), on "*Caesaria hirsuta*", also bearing labels: "Cicadella sp." and "Paratype" and "Poeciloscarta cardini M. & B."; two additional specimens, both bearing "paratype" labels, Central Oriente, Cuba, September 12, 1934 (L. C. Scaramuzza); one specimen, bearing a "paratype" label, Central Jaronu, Cuba, June 19, 1934 (L. C. Scaramuzza), three specimens of which two bear "paratype" labels and the third a "holotype" label, Jaronu, June 25, 1934 (L. C. Scaramuzza), all three bearing the label "E. E. A. Cuba, Ento. No. 8688" and one of the "paratypes" bearing the penciled label, "P. scaramuzzai n. sp.". All of the preceding specimens also bear a single additional label, "Monte". All of these are in the NCS collection except the holotype which is on indefinite loan to USNM. The holotype is a paratype of *Poeciloscarta cardini* Metcalf and Bruner, but is not conspecific with the holotype of the latter. The remaining "paratype" and "holotype" labels refer to a manuscript name.

Three additional specimens are at hand from Somorrostro, Havana, Cuba (Scaramuzza and Bruner), two August 20, 1935 and one August 16, 1936 (all NCS); two specimens, San Carlos Est., Guantanamo, Cuba, October 4-8, 1913 (AMNH).

A. imitatrix, n. sp., is closely related to *A. stali* (Signoret) in the form of the male genitalia except the pygofer of which the concave posteroventral margin is distinctive for *imitatrix*. Both species differ from all others in the genus in lacking aedeagal processes.

Apogonalia pinguis, NEW SPECIES

FIGURE 747, PAGE 924

Length of male and female 7.2-7.3 mm. Head bluntly produced, with median length of crown varying from slightly more than four-tenths to slightly more than one-half interocular width, and from slightly less than three-tenths to one-third transocular width; antennal ledges with anterior margins vertical and slightly concave in lateral view; clypeus broadly convex, not flattened

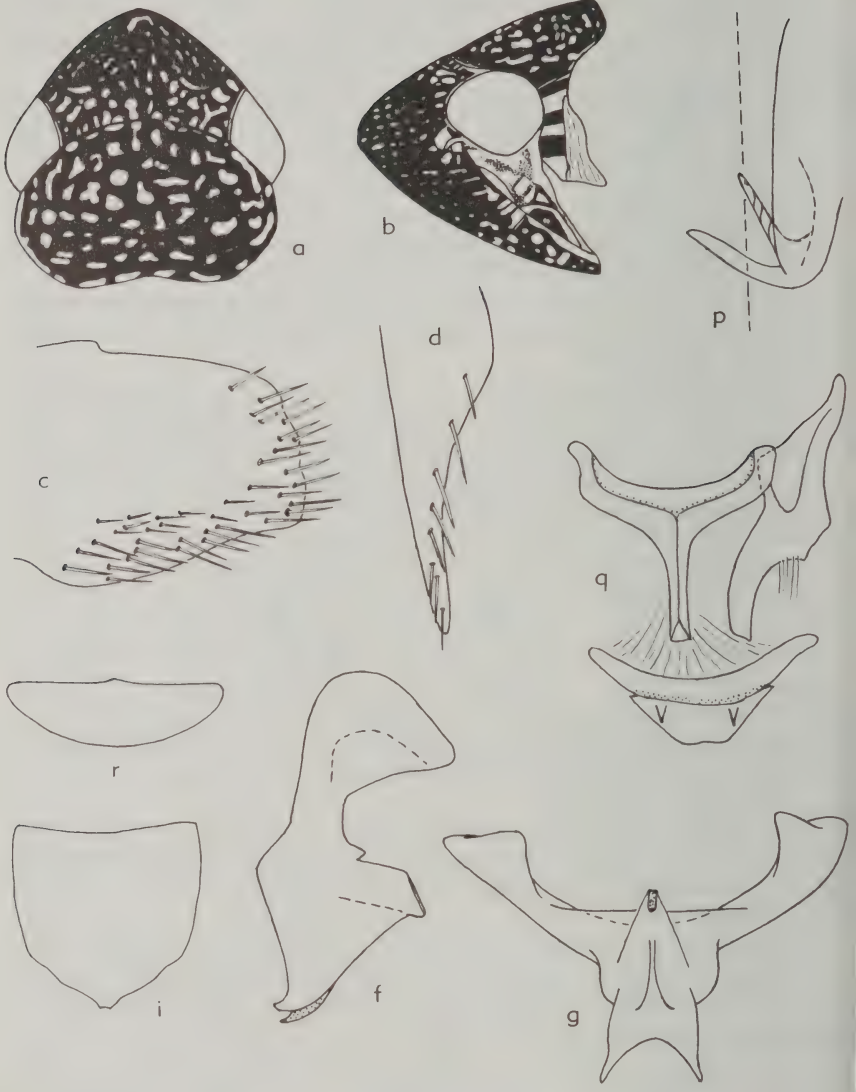


FIGURE 749.—*Apogonalia krameri*, n. sp. (*i*, *r*, from specimen from Fortin de las Flores, Vera Cruz, Mexico; remainder from specimens from Cuernavaca, Mexico; plate not shown in *c*): *p*, Male pygofer apex, left side, from caudoventral view; *q*, style, connective, and paraphyses, from dorsal view; *r*, median sclerite of genital chamber from anterior view.

medially, muscle impressions distinct. Pronotum not or only weakly transversely rugulose on disk; scutellum without transverse rugae behind transverse sulcus; forewing with membrane including all of apical cells, veins distinct. Male pygofer with posteroventral margin oblique and slightly convex, with few macrosetae near and parallel to it, without pygofer processes; plates with macrosetae very short; style not extending posteriorly as far as apex of connective, concavely truncate at apex; aedeagus with shaft very short, broad, its dorsal and posterior margins strongly regularly convex, its ventral margin concave, with a pair of basiventral processes extending posteriorly and not attaining apex of shaft and a pair of short acute apicoventral processes directed ventrally, atrium without processes; paraphyses symmetrical, consisting of broad basal plate and elongate tapering rami. Other structural characters as in generic description. Female abdominal sternum VII tapered posteriorly to a shallow narrow median notch.

Crown and pronotum sordid yellow with the median line at apex, two large angular spots on each side between crown and face and a small spot on each side close to median line on dorsum near apex, lateral clypeal sutures on crown, a pair of capitate spots touching hind margin near its middle and a smaller more lateral spot on hind margin behind each ocellus, black; pronotal black markings tending to form four irregular longitudinal stripes and an anterior spot behind each eye; forewing pink with some veins, the claval suture, a longitudinal mark in apical half of clavus near commissural margin, and a large bilobed marking bordering costal margin, black; clypeus with a broad median pale stripe and a pale vertical area over muscle impressions on each side, both margined with black; clypellus pale with a median black line; genae pale with a vertical black line beneath eye and a black spot next to apex of lorum; thoracic pleura mostly pale; legs sordid yellow to tan.

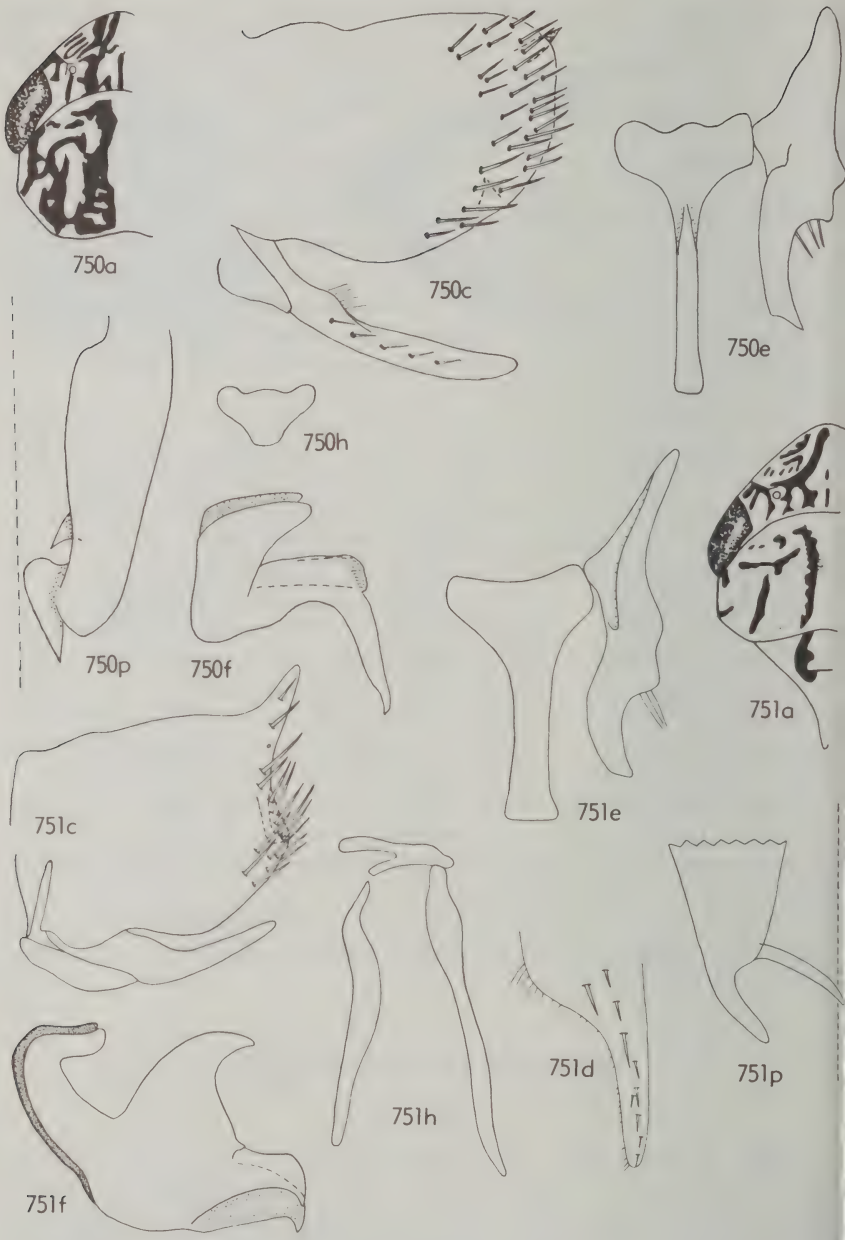
Holotype male and one female, Paso de la Vaca, Mons. Nouel - Constanza Rd., Prov. La Vega, Dominican Republic, December 27, 1955, alt. 1500 m. (J. Maldonado Capriles); one male and one female, Kenscoff, Haiti, January 18, 1948 (J. S. Caldwell) (USNM).

A. pinguis, n. sp., is similar externally to *A. robusta* (Walker) but is more robust. It is readily separable from *robusta* and from other species in the genus by the characters of the key.

Apogonalia krameri, NEW SPECIES

FIGURE 749

Length of male 8.8-9.6 mm, of female 8.8-9.5 mm. Head conically produced, with median length of crown varying from slightly less than one-half to six-tenths interocular width, and from three-tenths to almost four-tenths transocular width; antennal ledges with anterior margins oblique and usually slightly concave in lateral view; clypeus broadly convex, not flattened medially, muscle impressions distinct (indicated at least by color pattern, if not by relief characters) or not. Pronotum with posterior portion transversely rugose or not; scutellum with or without transverse rugae behind transverse

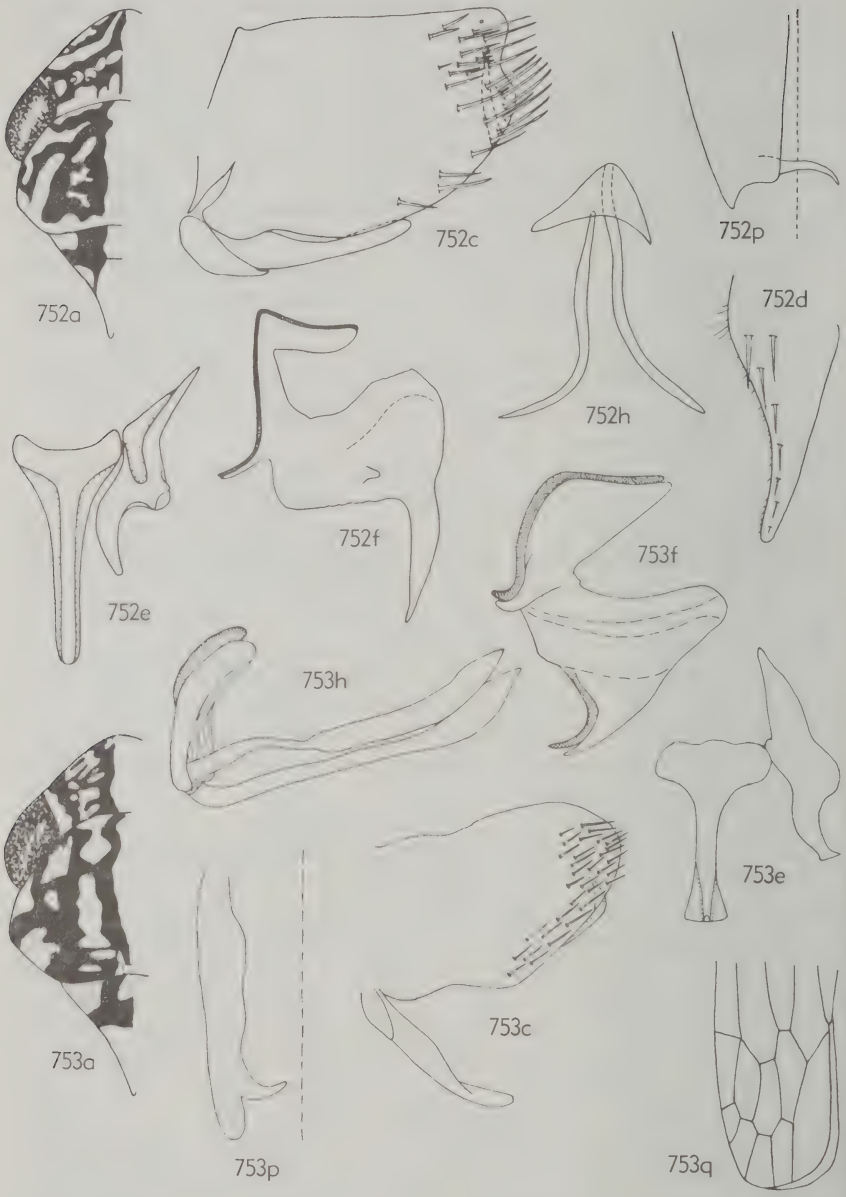


FIGURES 750, 751.—750, *Apogonalia dampfi*, n. sp. (from specimen from Costa Rica): *p*, Male pygofer, left side, from caudoventral view. 751, *A. mediolineata* (Fowler) (from specimen from Mexico; *h* from caudoventral view): *p*, Male pygofer apex, right side, from ventral view.

sulcus; forewing with membrane including all of apical cells; veins distinct. Male pygofer with posterodorsal and posteroventral margins oblique, apex strongly convex, with many macrosetae located parallel to posterodorsal and posteroventral margins, with a pair of processes (or a single process forked at base) arising at apex, extending mesally and crossing median line; plates with uniseriate macrosetae; style extending posteriorly almost as far as apex of connective, truncate apically; aedeagus with shaft very short, straight, directed posteriorly, with a pair of broadly triangular symmetrical processes directed ventrally and curved slightly anteriorly at their apices, atrium without processes; paraphyses symmetrical, consisting of a broad single median plate and a pair of very short acute rami. Other structural characters as in generic description. Female abdominal sternum VII somewhat variably produced (the variation accentuated by degree of convexity of surface), the posterior margin oblique on each side of median angle or median apical notch; genital chamber with a semiovate median sclerotization; apices of second valvulae acute, much as in *A. germana* (Fowler) (fig. 755*m*).

Color of crown, pronotum, and scutellum black, with numerous small yellow lobate spots which are occasionally confluent to some extent on the scutellum, apical portion of scutellum occasionally yellow; forewing dull red, longitudinal veins black, except vein M and most of longitudinal veins bordering anteapical and apical cells, the black veins bordered irregularly and narrowly with paler (ivory, yellow, bluish yellow, or pink) markings which delimit an additional veinlike black line near inner base of clavus, the pale markings interrupted often, and in clavus of some specimens occurring only in form of small dots; face with clypeus and clypellus marked like crown, remainder of face and thoracic pleura with variable black and ivory markings; legs dull red to dull yellow, occasionally with anterior and middle femora bearing a black stripe; abdomen dull red.

Holotype male, Cuernavaca, Morelos, Mexico (N. L. H. Krauss), on *Lantana camara* L. (USNM). The following additional specimens from Mexico have been studied: SONORA: Vinatería, Río Mayo, July 7, 1935 (L. G. Gentner), seven specimens; San Bernardino, Río Mayo, July 15, 1935 (L. G. Gentner), one specimen; Bakachaka, Río Mayo, July 5, 1935 (H. H. Gentry), one specimen; "Arroyo Guajaray", October 25, 1934 (H. S. Gentry), one specimen; Los Mochis, June, 1922 (collector?), one specimen; Guasaremos, August 5, 1935 (L. G. Gentner), one specimen; San Carlos Bay, August 10, 1960 (P. H. Arnaud, Jr., E. S. Ross, D. C. Rentz), two specimens (all preceding in CAS). SINALOA: 8 mi. w. of Palmito, June 23, 1961, 6100 ft. (R. A. Scheibner), one specimen; Culiacán, July 16, 1963 (P. J. Spangler), eleven specimens (USNM). NAYARIT: "San Juan Peyotan", August 2, 1955, one specimen; La Mesa de Nayarit, July 19, 1955, two specimens; Jesús María, July 6, 1955, four specimens; July 26, 1955, four specimens; July 27, 1955, three specimens (all collected by B. Malkin) (CAS). SAN LUIS POTOSI: El Salto Falls, June 14, 1963 (R. E. Woodruff), ten specimens (FSPB). JALISCO: Guadalajara vicinity, December, 1914 (L. Diguet), one specimen (MHNP); 37 mi. s. of Guadalajara, June 24, 1957 (J. Chemsak and B. J. Rannells), one specimen; 6 mi. s. of Chapala, June 30, 1963 (J. Doyen),



FIGURES 752, 753.—752, *Apogonalia fraterna*, n. sp. (from specimen from Jalisco, Mexico; *h* from dorsal view): *p*, Male pygofer, left side, from dorsal view. 753, *A. blanchardi* (Signoret) (*q* from specimen from Córdoba, Vera Cruz, Mexico; remainder from Guatemala; *h* from lateral view): *p*, Male pygofer, right side, from ventral view; *q*, forewing apex.

one specimen (UCAL). MICHOACAN: Puente de Ixtla, July 4, 1900 (O. C. Deam), one specimen (USNM); 11 mi. e. of Apatzingán, August 20, 1954 (Linsley, MacSwain and R. F. Smith), one specimen (UCAL); Zitacuaro, September 29, 1941 (DeLong, Good, Caldwell and Plummer), one specimen (OSU). COLIMA: Volcán (L. Conrad), one specimen (USNM); same locality, 1918 (John Lane), one specimen (SSM). DISTRITO FEDERAL: Real de Arriba, Temescaltepec, May 24, 1933 (R. L. Usinger), ten specimens; same locality, July 10, 1933 (H. E. Hinton and R. L. Usinger), one specimen; Tejupilco, Temescaltepec, June 17, 1933 (same collectors), one specimen; (UCAL). MORELOS: Cuernavaca, August 15, 1954 (R. R. Dreisbach), three specimens, (RD); same locality, June (collector unknown), five specimens, and June 16, 1898 (collector unknown), two specimens, and October 31, 1923 (E. G. Smyth), one specimen; Acapulco Road, August 22, 1936, two specimens, August 23, 1936, two specimens, August 24, 1936, ten specimens, August 29, 1936 two specimens (all Ball and Stone) (USNM); near Tijalpa, June 22 and 23, 1963 (R. E. Woodruff), 125 specimens (SPBF). PUEBLA: Puebla, May 28, 1922 (E. G. Smyth), one specimen (USNM). GUERRERO: Acapulco, August 20, 1936, two specimens, and August 24, 1936, one specimen (Ball and Stone) (USNM). VERA CRUZ: Orizaba, June (collector?), one specimen (USNM); Fortín, June 25, 26, 27, 1963 (R. E. Woodruff), ten specimens (SPBF); Orizaba, 1897 (R. Oberthur), one specimen (USNM). CHIAPAS: near Los Amates, May 22, 1964 (F. S. Blanton and R. E. Woodruff), six specimens (SPBF). One additional specimen was intercepted from Mexico at Nogales, Arizona, July 14, 1936 on leaves of mango. Two specimens were also studied from the "Department of Comayagua", May 29, 1964 (F. S. Blanton, A. B. Broce, and R. W. Woodruff) (SPBF). The specimens collected by Woodruff, or Woodruff and others were taken with a black-light trap.

A. krameri, n. sp., has been commonly misidentified as *Tettigonia punctulata* (Signoret), but the lectotype of the latter is not congeneric. *A. krameri* is readily separable from other species of the genus on the basis of the color pattern of the forewings in which markings are conspicuously absent in a longitudinal area on each side of vein M, but present on both sides of the unmarked area. In the male genitalia, the double apical pygofer process of which the rami extend across the median line, are distinctive. In a series from the Acapulco region, in the USNM, the pronotum is yellow behind the transverse sulcus.

This species is named in honor of Dr. James P. Kramer, of the Systematic Entomology Laboratory of the U. S. Department of Agriculture. Dr. Kramer has sacrificed a great deal of time in assisting with numerous technical problems related to this paper and in lending specimens under his care.

Apogonalia dampfi, NEW SPECIES

FIGURE 750, PAGE 928

Length of male 8.4-10.4 mm, of female 9.1-9.3 mm. Head conically produced, with median length of crown varying from one-half or slightly less

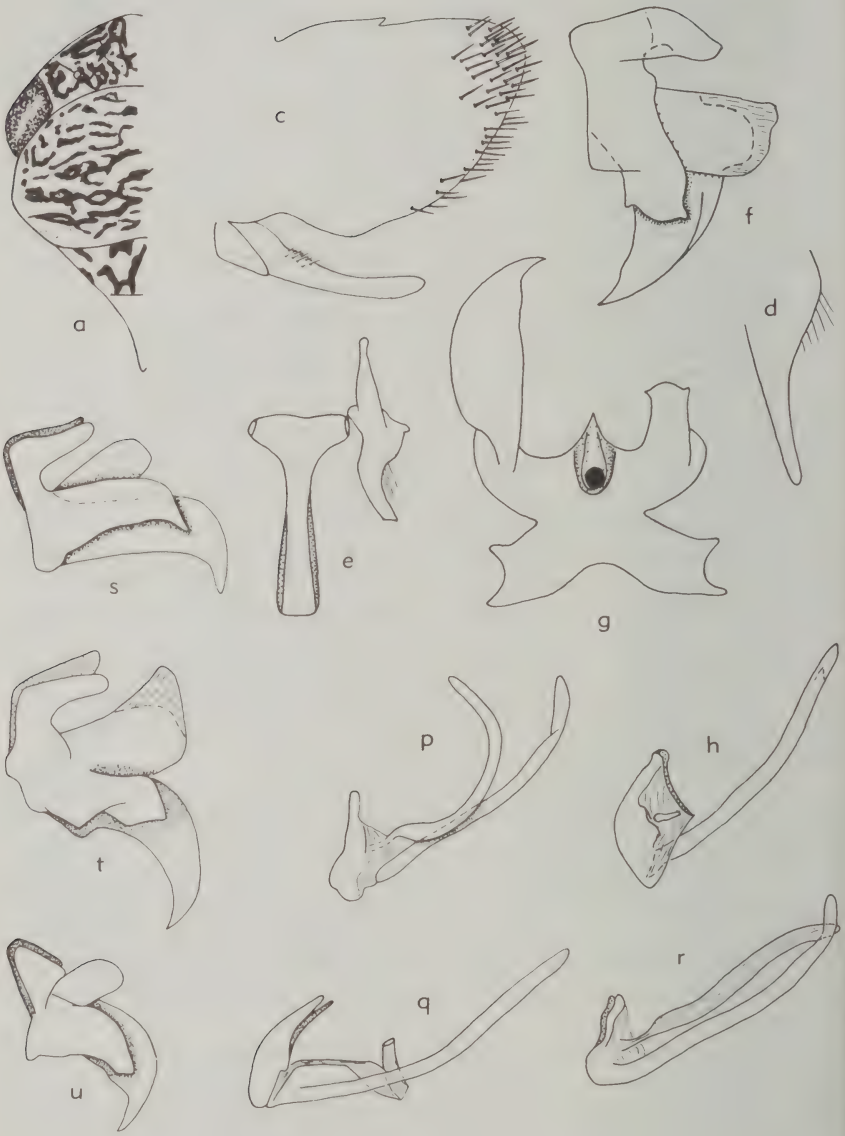


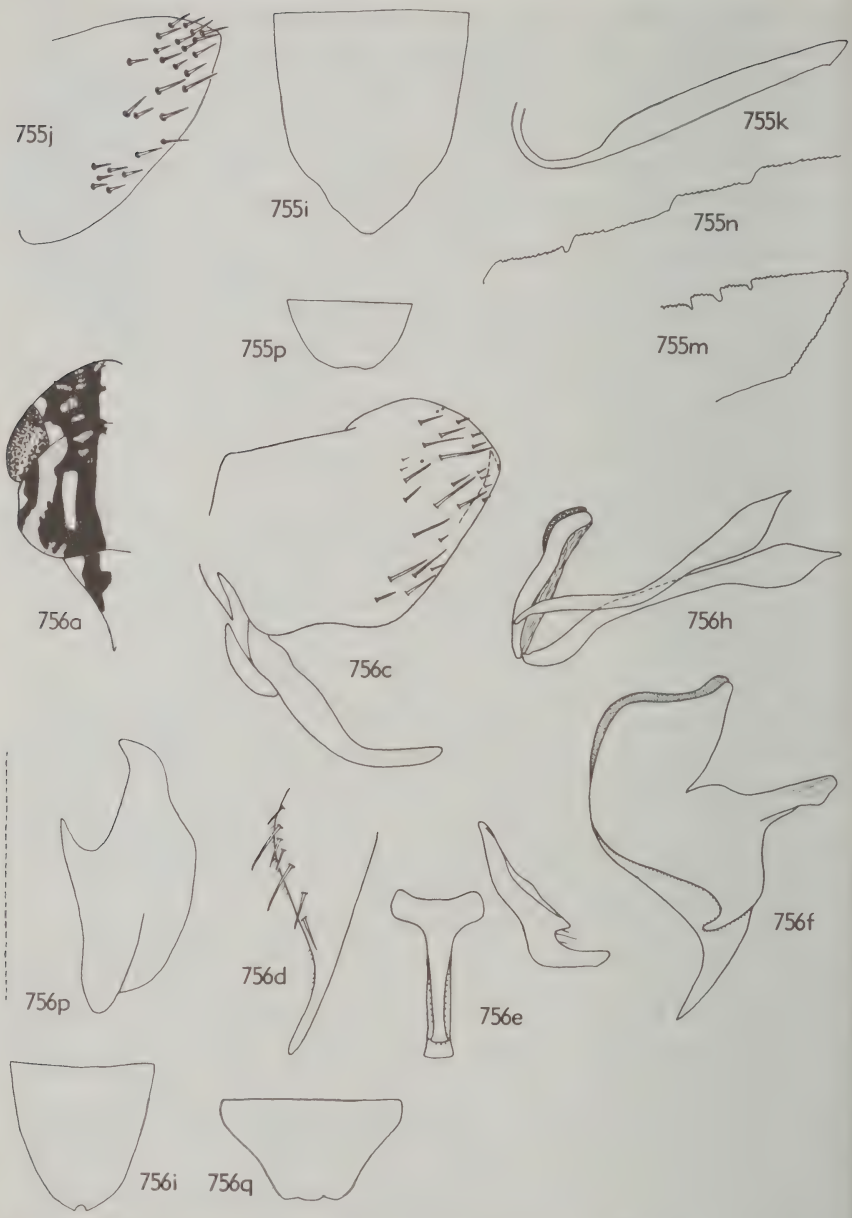
FIGURE 754.—*Apogonalia germana* (Fowler) (see also fig. 755) (*p*, *r*, *s*, *u*, from specimens from Morelos, Mexico; *q*, *t*, from Vera Cruz, Mexico; remainder from Jalapa, Vera Cruz, Mexico; *h* from lateral view): *p-r*, Paraphyses from lateral view; *s-u*, aedeagus from lateral view.

than one-half interocular width, and from one-fourth to almost one-third transocular width, clypeus broadly and slightly convex, slightly flattened medially. Pronotum not or indistinctly transversely striate, scutellum without transverse striae behind transverse sulcus; forewing with membrane including inner three apical cells; veins distinct. Pygofer with posterior margin very broadly convex above and below a very slight apical concavity, with numerous macrosetae parallel to posterior and part of posteroventral margins, in ventral view each side with a short apical process which is convex anteriorly, its posterior portion acute, directed posteriorly, and appearing parallel to its complement on the other side, each side also with a shorter angular process arising subapically and directed mesally and slightly posteriorly; style not extending nearly as far posteriorly as apex of connective, apex oblique and slightly concave; aedeagus with shaft long for the genus, with a slender apical process arising ventrally, directed ventrad, gradually narrowed and acute apically, atrium without processes; paraphyses represented by a very small minute median trilobate sclerite very close to apex of connective. Other structural characters as in *A. krameri*, n. sp.

Color of crown, pronotum, and scutellum yellow, heavily marked with black delineating the following major yellow areas: on the crown a broad median stripe bisected by a narrow black stripe except apically, and a broad area bordering each inner eye margin; on the pronotum a median stripe surrounding a narrow longitudinal median black stripe in part of its length, and an interrupted arcuate band on each side converging anteriorly towards the median stripe; on the scutellum three basal spots in a transverse row, and a median spot behind transverse sulcus; forewings reddish purple, with three spots between claval veins, three spots in base of corium, a spot at apex of cell M and two spots in apical half of costal cell, yellow, and each at least partially bordered with black; fourth apical cell black with a pale spot on inner and outer margins, apex of membrane smoky-black; face and propleura yellow, variously marked with black; legs varying from yellow with variable black markings to almost completely black; abdomen dull red.

Holotype male, El Vergel, Chiapas, Mexico, May 19, 1935 (collector unknown), eight males, two females and one specimen without abdomen, all labeled "Vergel" or "Finca Vergel", all collected between May 11 and May 30, 1935, a few bearing label "A. Dampf" or "A. Dampf Coll."; one female, "Finca Victoria", San Luis Potosí, Mexico, June 28, 1935; one female "Finca Peru", Chiapas, Mexico, November 7, 1931 (J. Parra), all in DeLong collection (OSU); three specimens, environs of Guatemala City, 1908 (R. Guerin) and one specimen, Costa Rica, 1921 (Paul Serre) (all MHNP); one specimen, Puente Macuilapa, Chiapas, near Los Amates, May 22, 1964 (SPBF); two specimens, Piedras Negras, Costa Rica (Schild and Burgdorf); one specimen, Higuito, San Mateo, Costa Rica (Pablo Schild); and one specimen labeled "Cordova" (all USNM).

Externally, *A. dampfi*, n. sp., is similar to *A. blanchardi* (Signoret), but it may be separated readily from the latter by its (usually) smaller size, 8.4-10.4 mm, compared with 10.4-11.2 mm in *blanchardi*. The male pygofer processes (fig. 750*b*) differ from those of any other species in the genus. Fowler's (1899d, pl. 15, figure 27) illustration of *A. granulata* (Walker) appear to belong to the



FIGURES 755, 756.—755, *Apogonalia germana* (Fowler) (see also fig. 754) (from specimen from Vera Cruz, Mexico): *p*, Median sclerite of genital chamber. 756, *A. fractinota* (Fowler) (*a* from specimen from British Honduras; *i*, *q*, from Potrerillos, Panama; remainder from Honduras; *h* from lateral view): *p*, Male pygofer apex, right side, from caudal view; *q*, median sclerite of genital chamber.

species described here, but the lectotype of the Walker species, and a male which I compared with the lectotype and determined by Fowler as *granulata* are actually *A. blanchardi* (Signoret).

This species is named in honor of A. Dampf whose collections have been important to the development of knowledge of the Mexican fauna.

Apogonalia fraterna, NEW SPECIES

FIGURE 752, PAGE 930

Length of male 8.2-8.7 mm, of female 8.4-8.7 mm. Head conically produced, with median length of crown varying from slightly more than one-half to two-thirds interocular width, and from slightly more than one-third to slightly more than four-tenths transocular width; antennal ledges with anterior margins oblique and rectilinear or concave in lateral view; clypeus convex, not flattened medially, muscle impressions distinct. Pronotum with posterior portion of disk not or weakly transversely striate; scutellum with or without transverse striae behind transverse sulcus; forewing with membrane including all of apical cells and apical portions of outer two anteapical cells, not sharply delimited basally; veins distinct. Pygofer with posterior margin truncate and slightly concave, with numerous macrosetae located parallel to posterior and posteroventral margins, with a single slender apical acute process extending mesally and crossing median line; plates with macrosetae biseriate at base, uniseriate over most of length of plate; style not extending posteriorly nearly as far as apex of connective; aedeagus with shaft very short, directed posteriorly, with an unpaired slender, tapering, acute, apical process extending ventrally, a pair of minute angular processes, one on each side of shaft near midlength, and with a short acute process arising ventrally on each side of atrium, extending anterolaterally; paraphyses consisting of a pair of slender, elongate, similar arms arising asymmetrically from a basal median plate.

Color of crown, pronotum, and scutellum yellow mixed with black, crown with longest uninterrupted yellow marking consisting of an arc on each side, converging and acutangularly confluent apically, remainder of crown markings variable but consistently with a median black mark in basal half (breaking the continuity of the median pale pronotal marking); pronotum with a median stripe and a pair of lateral arcuate markings on each side, yellow, the lateral markings curving mesad anteriorly, and usually convergent, occasionally interrupted, with smaller less constant additional yellow pronotal markings; scutellum with median line and basal angles yellow. Forewing reddish, with a line on humeral margin, claval suture, and costal margin, black; with broad elongate pale areas on each side of claval veins, a narrower pale longitudinal stripe the full length of brachial cell, another bisecting cell M and inner anteapical cell, and a broad pale submarginal stripe within black costal margin. Face yellow; clypeus with four pairs of longitudinal black stripes, each pair converging above transclypeal suture; clypellus with a Y-shaped median and two short lateral longitudinal black markings; remainder of face and thoracic pleura yellow variably marked with black. Legs from dull

yellow to sordid brown, usually marked with narrow longitudinal black stripes.

Holotype and one additional male, Cuernavaca, Morelos, Mexico, August 6, 1938 (L. J. Lipovsky); one male, Tecolotan, Jalisco, Mexico, September 14, 1938 and one female, Guadalajara, Jalisco, Mexico, September 17, 1938 (both L. Lipovsky) (NCS). One female, 10 km. west of Zitacuaro, Michoacán, Mexico, July 11, 1951 (P. D. Hurd) (UCAL). Holotype on indefinite loan to USNM.

Externally, *A. fraterna*, n. sp., is similar in appearance to *A. mediolineata* (Fowler), but the median pale line of the pronotum of the latter extends forward on the crown almost to its apex. In *fraterna* the line is indistinct, at

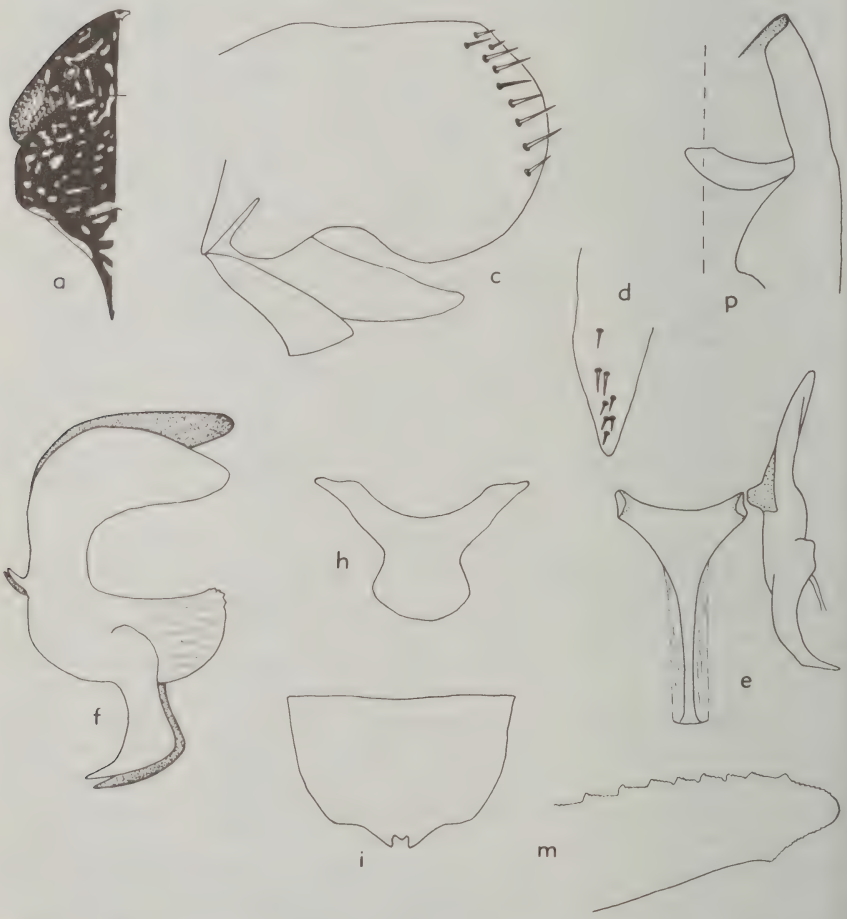


FIGURE 757.—*Apogonalia omani*, n. sp. (*i*, *m*, from topotype; remainder from holotype; *h* from dorsal view): *p*, Male pygofer apex, right side, from caudal view.

best, on the crown. Also, instead of the four pairs of vertical black stripes present on the face of *fraterna*, the face of *mediolineata* may be almost entirely black, marked minutely with yellow, or yellow (a somewhat teneral specimen) marked with black but without the vertical stripes. The two species differ markedly in the structure of the aedeagus, also, with *fraterna* having an unpaired aedeagal process in contrast to the large paired processes of *mediolineata* (fig. 751*f*). In the last character, *fraterna* is similar to *A. dampfi*, n. sp., but differs in the pygofer processes and the paraphyses.

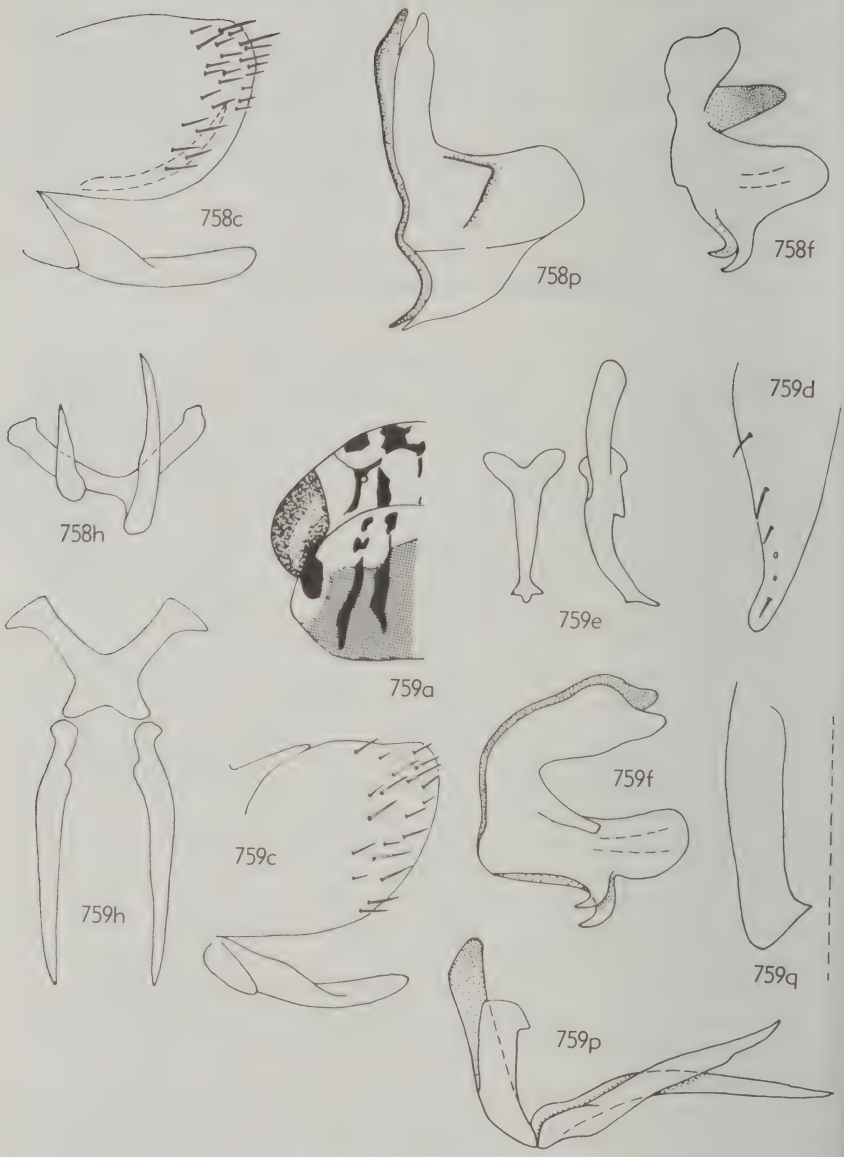
Apogonalia omani, NEW SPECIES

FIGURE 757

Length of male 7.6-7.7 mm, of female 8.1 mm. Head conically produced, with median length of crown varying from more than one-half to two-thirds interocular width and from almost four-tenths to slightly greater than four-tenths transocular width; antennal ledges with anterior margins oblique and slightly concave in lateral view; clypeus broadly convex, not flattened medially, muscle impressions distinct. Pronotum with posterior portion transversely striate; scutellum with transverse striae behind transverse sulcus; forewing with membrane including all of inner three apical cells and apical half of fourth apical cell; veins distinct. Male pygofer with posterior margin very broadly convex, surface with few macrosetae located mostly in an irregular row parallel to upper portion of posterior margin, with a pygofer process on each side arising ventrally and anteapically, broader than usual in the genus, extending mesally and crossing median line, abruptly narrowed apically; plates unusually short for the genus, with irregularly biseriate small macrosetae; style extending posteriorly not nearly as far as apex of connective, truncate apically; aedeagus with shaft short, directed posteriorly and curved very slightly dorsally, with a pair of conspicuous processes arising ventrally on shaft, directed ventrally, broadened anteapically in lateral view and curved anteroventrally at their narrowed apices, atrium with a short acute process located ventrally on each side; paraphyses represented by a short, median, Y-shaped sclerite. Female abdominal sternum VII with posterior margin much less produced medially than in other species in the genus; ovipositor with second valvulae each strongly convex at apex; genital chamber without a median sclerite (specimen slightly teneral). Other structural characters as in generic description.

Color of crown, pronotum, and scutellum black, with numerous small yellow spots and irrorations, the yellow markings not forming patterns of specific importance; forewing dull red, with a pattern in form of an oblique ivory-colored loop which is open on clavus, closed on corium, the ivory markings with irregular markings which are bordered with black; face black, minutely marked with yellow; thoracic pleura yellow with black markings; legs pale brown to deep brown.

Holotype male, and one additional male, Santa Rita Mountains, Arizona, June 27, 1933 (P. W. Oman); one female, same locality, September 10, 1933,



FIGURES 758, 759.—758, *Apogonalia histrio* (F.) (*p* from specimen from Cristo, Oriente, Cuba; remainder from Puerto Rico; *h* from ventral view): *p*, Aedeagus from lateral view. 759, *A. robusta* (Walker) (from specimen from Cuba; *h* from caudoventral view): *p*, Paraphyses from lateral view; *q*, male pygofer, right side, from ventral view.

"Bryan lot", (all in USNM). The additional male bears Oman's determination label: "Tettigonia monticola Fowler".

A. omani, new species, differs from *A. monticola* (Fowler) in the shape of the aedeagal processes in lateral view, in the broader and longer pygofer process of *omani*, which in the lectotype of *monticola* is like the present illustration of *A. blanchardi* (Signoret) (figure 753*p*), and in the very short triangular male plates of *omani*.

This species is named in honor of Paul W. Oman.

Apogonalia woodruffi, NEW SPECIES

FIGURE 761, PAGE 940

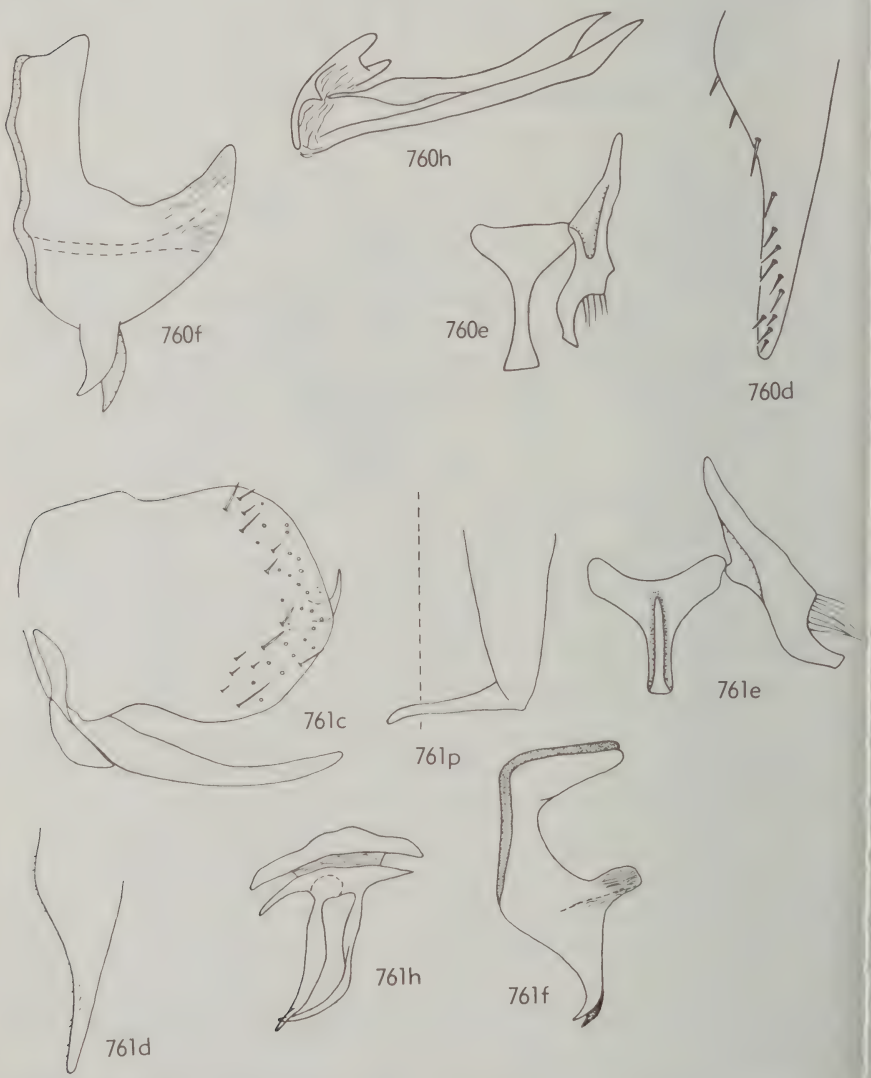
Length of male 9.4-9.8 mm, of female 9.7-10.0 mm. Head conically produced with median length of crown varying from one-half to slightly less than six-tenths interocular width, and from approximately three-tenths to slightly less than four-tenths transocular width; antennal ledges in lateral view with anterior margins vertical or slightly oblique and varying from rectilinear to slightly concave; clypeus very broadly convex, slightly flattened medially, muscle impressions not distinct. Pronotum with posterior portion obscurely striate; scutellum usually without transverse striae behind transverse sulcus; forewing with membrane including inner apical cell and at least apical portions of remaining apical cells, veins distinct. Male pygofer with posterior margin broadly convex, with numerous macrosetae located parallel to posterior and posteroventral margins, with a process arising apicoventrally on each side, extending mesally and crossing median line; plates extending posteriorly as far as pygofer apex, without macrosetae; style extending posteriorly approximately as far as apex of connective, truncate apically; aedeagus with shaft slender, straight, directed posteriorly, with a pair of tapering symmetrical processes arising near base of shaft, directed ventrally and curved slightly anteriorly at their apices, atrium without processes; paraphyses consisting of two slender elongate structures arising asymmetrically. Female abdominal sternum VII with posterior margin gradually and convexly narrowed to a median apical notch; genital chamber with a biundulate median sclerotization, apices of second valvulae as in *A. krameri*, n. sp.

Color of crown, pronotum, and scutellum black, with numerous small yellow spots on crown and pronotum, some of these occasionally larger and lobate, scutellum with three larger yellow spots in a basal transverse row, and a larger yellow anteapical spot; forewings dull red with numerous ivory to bluish spots on clavus and usually on adjacent corium, vein R usually (type) with an interrupted pale border, costal cell usually with small pale spots; face and thoracic pleura black, marked with yellow or ivory spots which tend to be larger on clypellus, genae, and pleura; legs ferruginous, occasionally marked with black and very dull yellow.

Holotype male and one female, Orizaba, Vera Cruz, Mexico, June (USNM); three males and one female, Fortín de las Flores, Vera Cruz, Mexico, June 25, 1963 (R. E. Woodruff), in black light trap (SPBF); one male, El

Salto Falls, San Luis Potosí, Mexico, June 23-24, 1965 (O. S. Flint) (USNM); one male, "Yepocapa", Guatemala, May, 1948 (H. T. Dalmat) (USNM).

A. woodruffi, n. sp., is similar in external appearance and color markings to *A. krameri*, n. sp., from which it may be separated readily by the form of the pygofer processes which are single in *woodruffi* in contrast to double in *krameri*, and by the paraphyses which have elongate arms in contrast to the condition



FIGURES 760, 761.—760, *Apogonalia monticola* (Fowler), lectotype (*h* from lateral view). 761, *A. woodruffi*, n. sp., holotype (*h* from dorsal view): *p*, Male pygofer apex, left side, from ventral view.

in *krameri*. I have been able to separate the two species on the basis of color pattern of the scutellum which is variable in *krameri*, but never with the yellow spots as described above for *woodruffi*.

A. woodruffi, n. sp., is named in honor of Dr. R. E. Woodruff who collected it and numerous other interesting leafhopper species in Mexico.

128. MACUGONALIA, NEW GENUS

FIGURES 762-776

Type-species: *Tettigonia sobrina* Stål.

Length of male 5.6-12.7 mm.

Head very slightly produced, with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than one-third to six-tenths interocular width and from approximately one-fifth to less than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles, each ocellus definitely closer to adjacent anterior eye angle than to median line of crown, crown convex and without a transverse concavity across ocelli, without a median fovea and without sculpturing, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and usually rectilinear (convex in some specimens); face without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus varying from strongly convex to flattened medially, muscle impressions not very distinct in most species, transclypeal suture obscure near middle, clypellus swollen or not, in profile with a portion of its basal half continuing contour of clypeus, remainder more nearly horizontal.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin varying from slightly concave to slightly convex, disk not or usually only obscurely sculptured (exception: *M. tribunicia* (Berg)), not pubescent; scutellum not transversely striate behind transverse sulcus. Forewing with membrane clearly delimited or not, variable interspecifically in extent; veins distinct or not (varying interspecifically), with three closed anteapical cells of which the bases of the inner two are usually in the same transverse line, the base of the outer anteapical cell occurring slightly more proximally, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, apex varying interspecifically from narrowly to broadly rounded, with many macrosetae in a group located on posterior half of disk and extending anteroventrally parallel to ventral pygofer margin, pygofer processes absent (the pygofer apex is curved mesad and bears characteristic emarginations in *M. sobrina* (Stål), but is not differentially sclerotized). Plates very short, triangular (exception: *M. fritilla*, n. sp.),

not extending posteriorly one-half distance to pygofer apex, each with a regular or irregular row of macrosetae (exception: *fritilla*). Style extending posteriorly almost, or completely, as far as apex of connective, truncate or not apically, with a lateral lobe located near midlength of shank. Connective Y-shaped with arms widely divergent. Aedeagus short, convex dorsally with a pair of elongate slender processes arising basiventrally and exceeding apex, and with a pair of apicoventral lobes. Paraphyses absent or vestigial (except in *fritilla*).

Female abdominal sternum VII produced posteriorly and with apex rounded or acute, in some species extending almost as far posteriorly as apex of ovipositor. Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvulae broadened beyond basal curvature, with teeth triangular near base of expanded portion, irregular near apex of basal third of expanded portion in some species, quadrate and regular in apical two-thirds, with secondary denticles on most of the teeth except basal ones, apices variable, but not acute, with a slight preapical ventral concavity in some species (fig. 762*m*). Pygofer with a number of macrosetae on posterior third and a smaller number arising more basiventrally near ventral margin.

Most species of *Macugonalia* are mottled. For most species, the male genitalia do not offer diagnostic characters, and the female genitalia are similar in several species. The key works consistently for nearly all the specimens I have seen. Specimens have been examined from the West Indies (a single rare species), Costa Rica, Panama and Trinidad Island southward to Bolivia, southern Brazil, Paraguay, and Argentina. *Macugonalia* is close to *Apogonalia* Evans, in the treatment of which distinguishing characters are discussed.

Species similar externally to *Macugonalia* are found in the new genera *Willeiana* and *Versigonalia*. The shape of the male pygofer, the short plates, and the lack of paraphyses will separate *Macugonalia* from these and from most other similar genera.

Some specimens of *Macugonalia moesta* (Fabricius) were swept from alfalfa, near Iquitos, Peru, by Young and Juan Gonzalez. A few specimens of *M. redundans* (Fowler) in the USNM were collected on cacao by Barber and Schwarz in Guatemala.

I have not seen any specimen eligible to be the type of *Tettigonia dubia* Signoret (and automatically of its replacement name *Macugonalia brasiliensis* (Metcalf)). The name has been applied to several of the species in the list of species, by older authors.

My interpretation of *Cicada contaminata* Fabricius rests on specimens from Peru, compared with the lectotype. The crown, pronotum, and scutellum are mottled yellow and black, but with no large areas of either, the mottling extending ventrally on the clypeus to the transclypeal sulcus. The present interpretation of *Tettigonia cavifrons* Stål rests on specimens compared with the lectotype. This species is greatly variable in size.

Tettigonia dallasi Signoret is interpreted here in the sense of the lectotype. Of the species which have large spots at the base of the forewings, it is more closely inscribed with black on crown and pronotum. A specimen sent to me from MHNP labeled "semiguttata Sign., Coll. Germ." appears to be one of

the syntypes of *semiguttata* (Signoret). It belongs in *dallasi*, but the lectotype of *semiguttata* is not conspecific with this syntype.

The lectotype of *Tettigonia geographica* Signoret and two additional specimens from HU do not have large pale spots at the base of the clavus and corium of the forewings, but they appear to be conspecific with a number of specimens which do have such spots.

My interpretation of *Tettigonia leucomelas* Walker is based on a male, compared with the holotype in the British Museum. The male agrees well with the illustrations published here (fig. 766). I have placed *albopunctulata* (Taschenberg) in synonymy with *leucomelas* in the list of species, below, as a result of a study of the only specimen sent to me from the Taschenberg collection in Martin Luther University. It is a female. Like other specimens in the Taschenberg collection, the pin bearing the specimen bore no data, which were on a separate pin accompanying the specimen. This specimen is now selected as lectotype of *Tettigonia albopunctulata* Taschenberg The data are: "albopuncta-/ta m./Venez. Moritz."

Cicada moesta Fabricius is interpreted here in the sense of the lectotype. It is more commonly found in collections than any other species of the genus except *leucomelas,* and is easily recognized from the characters used in the key, and by the two oblique transcommissural gray bands, almost forming a circle, over the wings at rest.

Tettigoniella picta Distant was placed generically from an examination of the female lectotype. I have not compared specimens with the lectotype, but my identification agrees closely with the original description of this species, one of the most beautiful cicadellids I have ever seen. The bright yellow or creamy spot on the pro- and mesopleuron, in striking contrast to the bluish forewings, and to the pink disk of the pronotum and to the (usually) black of the face makes this species easily recognizable.

Tettigonia pyrrhoptera Stål is known to me only from the lectotype. It is close to *M. tribunicia* (Berg) but is 0.5 mm longer and the medial pair of pale longitudinal clypeal stripes is narrower than in *tribunicia*. The forewings are brick-red and unmarked in *pyrrhoptera,* marked with broken pale lines in *tribunicia*.

Macugonalia redundans (Fowler) can be separated easily from other species by the very large spots on the wings, not merely at the bases, and by the lack of other wing markings. The other known Central American species, *testudinaria* (Fowler) is finely mottled. *Tettigonia semiguttata* Signoret is known to me only from the lectotype and a series of specimens in NMV which were correctly associated with the lectotype. One of the latter has been used to construct the key.

Tettigonia rubricosa Uhler, is represented by a single male cotype in USNM from Kingstown, St. Vincent, B. W. I. (H. H. Smith), 1500 feet. The genitalia are similar to my illustrations of *M. leucomelas* (Walker), but the vestigial paraphysis is slightly different. The crown and pronotum are unmarked yellow tinged with orange.

Tettigonia rufonigra (Taschenberg) is known to me only from the holotype. It is close to *pyrrhoptera* (Stål), but would key out to *M. sobrina* (Stål) in the key, below. The female abdominal sternum VII is as in *sobrina*.

Tettigonia sobrina (Stål) is interpreted here in the sense of the lectotype. This is one of the few species for which I have found good anatomical characters (see key). *M. sobrina* is a mottled species and occurs within the range of *cavifrons* (Stål) which it resembles, but *sobrina* is smaller and the dark markings on its clypeus extend to the lateral clypeal suture, in contrast to *cavifrons*.

Tettigonia spinolai Signoret is interpreted here in the sense of the lectotype with the illustration of which I have compared the lectotype of *T. discrepans* Walker. *M. spinolai* is the largest of the species in the genus. The distinctive color pattern used in the key will separate it from other species.

Tettigonia testudinaria Fowler is interpreted here on the basis of the lectotype, of which the genitalia conform to figure 775 and to the illustrations of the connective, style, and aedeagus of *M. redundans*. *M. testudinaria* resembles *M. cavifrons* from which it differs in the characters used in the key. The type of *Cicadella tinctorula* Osborn agrees well with numerous specimens of *testudinaria* from Costa Rica and Panama.

Macugonalia tribunicia (Berg) is determined here in the sense of a specimen (fig. 773) borrowed some years ago, and bearing a type label. The similarity of this species to *M. pyrrhoptera* (Stål) is discussed above.

SPECIES OF *MACUGONALIA*

(*Type not seen)

andipa, n. sp. Colombia.

**brasiliensis* (Metcalf), 1965a:176 (*Tettigella*) (new name). Brazil. New combination.

**dubia* (Signoret), 1853b:343 (*Tettigonia*) (preoccupied).

cavifrons (Stål), 1862e:41 (*Tettigonia*). Venezuela, Colombia, Peru, Bolivia, S. Brazil, Paraguay, Argentina. New combination.

chanchama, n. sp. Peru.

contaminata (Fabricius), 1803a:72 (*Cicada*). Peru, Ecuador, Bolivia. New combination.

contristata, n. sp. E. Brazil.

dallasi (Signoret), 1853b:367 (*Tettigonia*). Brazil. New combination.

fritilla, n. sp. Venezuela, Brazil.

geographica (Signoret), 1855d:780 (*Tettigonia*). Brazil, N. Argentina. New combination.

hilarula, n. sp. Bolivia.

leucomelas (Walker), 1851b:764 (*Tettigonia*). Bolivia, S. and central Brazil, Paraguay, Argentina. New combination.

albopunctulata (Taschenberg), 1884a:440 (*Tettigonia*). New synonymy.

limitatula, n. sp. Colombia.

moesta (Fabricius), 1803a:74 (*Cicada*). Fr., Br. and D. Guiana; NE., NW., central Brazil; Ecuador, Peru, Bolivia. New combination.

parapicta, n. sp. Peru.

picta (Distant), 1908a:517 (*Tettigoniella*). Ecuador, Peru, Bolivia. New combination.

pyrrhoptera (Stål), 1862e:43 (*Tettigonia*). S. Brazil. New combination.

redundans (Fowler), 1899e:251 (*Tettigonia*). Mexico, Guatemala, El Salvador. New combination.

rubricosa (Uhler), 1895a:75 (*Tettigonia*). St. Vincent, B.W.I. New combination.

rufonigra (Taschenberg), 1884a:436 (*Tettigonia*). Brazil. New combination.

semiguttata (Signoret), 1853b:367 (*Tettigonia*). Brazil. New combination.

sobrina (Stål), 1862e:41 (*Tettigonia*). S. Brazil, Argentina. New combination.

spinolai (Signoret), 1853b:365 (*Tettigonia*). S. Brazil. New combination.

discrepans (Walker), 1858b:212 (*Tettigonia*).

testudinaria (Fowler), 1899e:251 (*Tettigonia*). Panama, Colombia. New combination.
tinctorula (Osborn), 1926b:180 (*Cicadella*). New synonymy.
tribunicia (Berg), 1879d:246 (*Tettigonia*). S. Brazil. New combination.
umbrosa, n. sp. Colombia.
**variabilis* (Signoret), 1854a:14 (*Tettigonia*). New combination.

KEY TO SPECIES OF *MACUGONALIA*

(Not included: *brasiliensis* (Metcalf), *rufonigra* (Taschenberg), and *variabilis* (Signoret))

1. Chief markings of forewings at rest a large circular transcommissural pale stripe narrowly bordered within and without with black (occasionally interrupted at costal margins)
moesta (Fabricius) (fig. 762)
Forewings not marked as above 2

2. Clypeus orange with a broad median black stripe
parapicta, n. sp., page 948
Clypeus not as above, if with a median black stripe, then with ground color not orange 3

3. Forewing with costal margin and claval suture broadly blue margined
limitatula, n. sp., page 949
Not as above 4

4. Clypeus black except laterally and bearing an elongate median orange spot ..... *andipa*, n. sp., page 950
Not as above 5

5. Forewings with one or more large distinct pale spots at base 6
Forewings without such spots or with large spots throughout 10

6. Forewings without pale veins and without conspicuous longitudinal pale markings ..... *leucomelas* (Walker) (fig. 766)
Forewings with pale veins or with conspicuous longitudinal pale markings 7

7. Forewings with veins pale, the pale coloring not extending into the adjacent cells 8
Forewings with longitudinal pale markings broader and extending into adjacent cells 9

8. Crown predominantly pale ..... *geographica* (Signoret)
Crown predominantly black, pale spots very small
semiguttata (Signoret)

9. Clypeus with five large yellow spots ..... *spinolai* (Signoret) (fig. 767)
Clypeus without clearly delimited large yellow spots
dallasi (Signoret)

10. Pronotum with a median and two lateral spots, the lateral ones attaining the lateral pronotal margins (Central American)
redundans (Fowler) (fig. 768)
Not marked as above 11

11. Forewings dull green except blue brachial cell
contristata, n. sp., page 951
Not as above 12

12. Pronotum not marked, or very indistinctly marked (West Indies) 24
Pronotum variously marked (not from West Indies) 13

13. Pronotum with about six large yellow spots; forewings not spotted
geographica (Signoret)
Pronotum with many spots, or with few small spots; forewings spotted 14

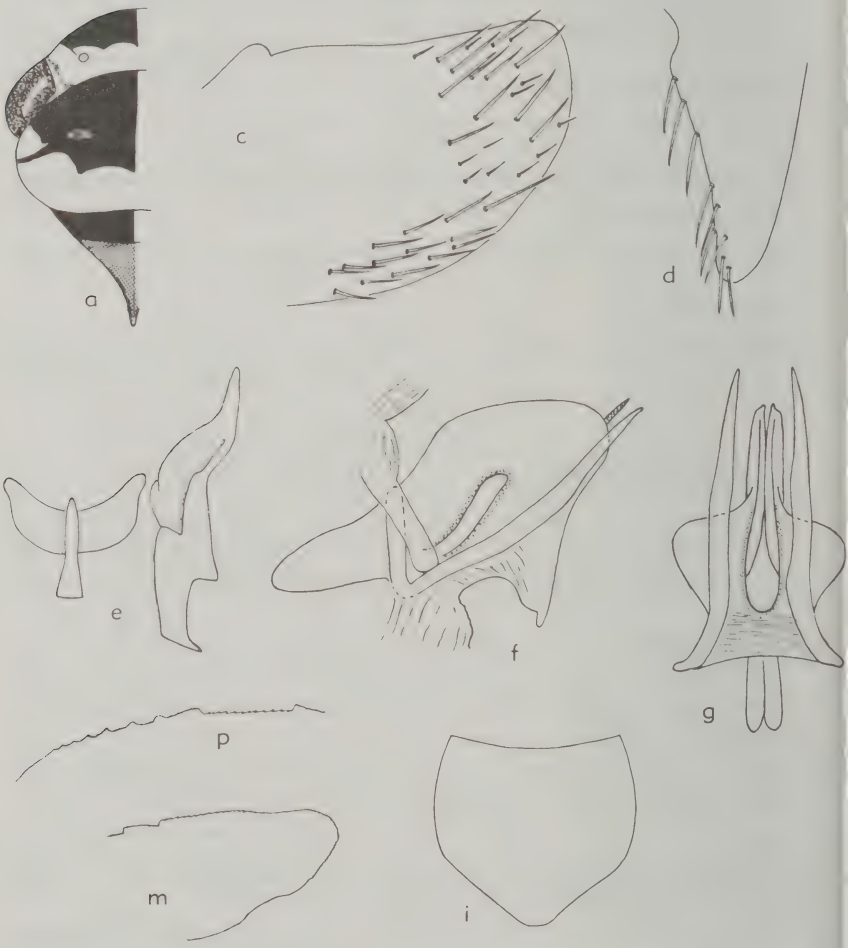


FIGURE 762.—*Macugonalia moesta* (F.). (*a* from specimen from Peru; *i*, *m*, *p*, from Chanchamayo, Peru; remainder from Bartica, British Guiana, plate not shown in *c*; part of anal tube shown in *f*): *p*, Teeth on basal one-third of second valvula.

14. Forewing with a small pale spot in corium opposite middle of claval suture and a similar spot opposite claval apex (other markings present, also) ..... *fritilla*, n. sp., page 953
Forewing not as above 15

15. Crown mottled 16
Crown black with a large pale spot surrounding ocelli, a small spot at apex and two at base, pale ..... *hilarula*, n. sp., page 953

16. Beak, all femora, and tibiae of anterior and middle legs castaneous *picta* (Distant) (fig. 772)
Above structures usually yellow, or partly yellow 17

17. Pronotum with lateral and posterior marginal pale borders and with a transverse band (often interrupted) across base of crown *leucomelas* (Walker) (fig. 766)
Pronotum not so marked or if so (*M. contaminata* (Fabricius)), then without a band on crown 18

18. Clypeus with disk black, the dark area enclosing two vertical yellow lines 19
Clypeus not so marked 20

19. Vertical yellow lines of clypeus sharply delimited *tribunicia* (Berg) (fig. 773)
Vertical yellow lines not very distinct ..... *pyrrhoptera* (Stål)

20. Female abdominal sternum VII with posterior margin less strongly produced in a broader less elongate process (fig. 774*i*); male pygofer in ventral view, with apex curved mesally and bearing a few denticulations (fig. 774*p*) ..... *sobrina* (Stål) (fig. 774)
Female abdominal sternum VII much more strongly produced in a spinelike process which covers much of the ovipositor; male pygofer in ventral view not modified apically 21

21. Scutellum entirely or mostly yellow and unmarked behind transverse sulcus 22
Scutellum finely mottled behind transverse sulcus 23

22. Crown in dorsal view with a median apical yellow areole that is larger than other pale markings of crown and pronotum; face with disk of clypeus yellow and with only a few vertical linear black markings (Central and South America) ..... *testudinaria* (Fowler) (fig. 775)
Crown in dorsal view not as above; face with black markings of disk of clypeus more extensive, at most with only a median vertical yellow area unmarked with black (South America) *cavifrons* (Stål) (fig. 776)

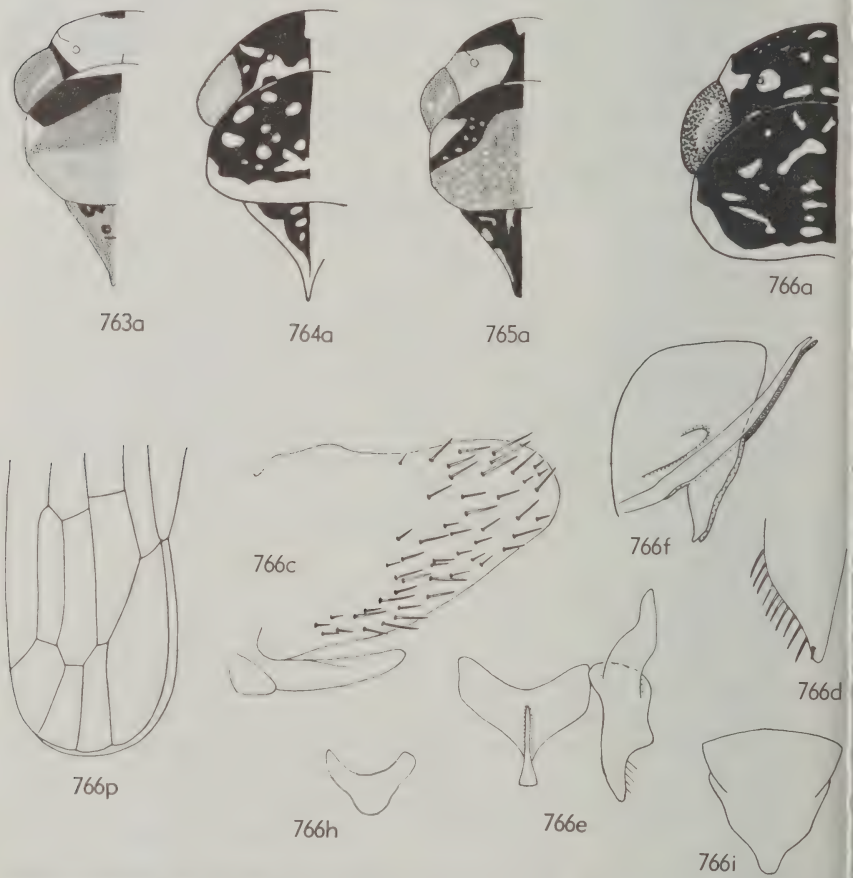
23. Dorsum of crown, pronotum, and scutellum with pale and dark markings approximately equally mixed (Peru, Bolivia) *contaminata* (Fabricius)
Dorsum of crown, pronotum and scutellum appearing black with pale markings ..... *umbrosa*, n. sp., page 956

24. Face black, thoracic pleura contrasting ivory (Peru) *chanchama*, n. sp., page 954
Face and propleura unicolorous tan (West Indies) ..... *rubricosa* (Uhler)

Macugonalia parapicta, NEW SPECIES

FIGURE 763

Length of male 9.3-9.9 mm. Head with median length of crown from three-tenths to almost one-third interocular width, and one-fifth transocular width; clypeus convex medially and with vermiculate rugae. Thorax with posterior pronotal margin convex; forewing with inner apical cell and apical portions of



FIGURES 763-766.—763, *Macugonalia parapicta*, n. sp. (from specimen from Utcayacu, Tarma, Peru). 764, *M. limitatula*, n. sp., holotype. 765, *M. andipa*, n. sp., holotype. 766, *M. leucomelas* (Walker) (*p* from Bahia, Brazil; remainder from Misiones, Argentina).

remaining apical cells membranous. Male pygofer with apex narrowly rounded; plates with macrosetae in a regular row; style subtruncate apically. Female unknown.

Crown yellow (type) to orange, with a large apical black spot and a narrow black line contiguous to inner eye margin; pronotum with a narrow anterior marginal line concolorous with crown and a broader transverse band behind it on anterior half, black, occasionally (type) suffused with castaneous, remainder of pronotum concolorous with crown or slightly darker; scutellum castaneous; forewing bluish-gray with sparse (type) or dense black vermiculations; face with clypeus and adjacent portions of genae concolorous with crown, except a broad median clypeal stripe (lower portion of apical black spot of crown), clypellus, lora, and remainder of genae, black; thoracic pleura concolorous with crown; legs mostly castaneous.

Holotype and four additional males, Pozuzo, Peru (Schaufuss) (MMB). One male, Utcayacu, Tarma, Dept. de Junín, Peru, 1600-3000 m., February 10, 1948 (F. Woytkowski) (AMNH).

M. parapicta, n. sp., is close to *M. picta* (Distant) from which it may be separated most readily by the broad median black stripe of the clypeus.

Macugonalia limitatula, NEW SPECIES

FIGURE 764, PAGE 948

Length of male 6.5-6.7 mm. Head with median length of crown from four-tenths to slightly more than four-tenths interocular width, and from slightly less than one-fourth to one-fourth transocular width; clypeus somewhat flattened medially and vermiculately rugulose. Thorax with posterior pronotal margin shallowly concave; forewing with membrane including all of apical cells. Male pygofer with apex narrowly rounded; plates with macrosetae in a regular row; styles narrowly rounded apically. Female abdominal sternum VII moderately produced and narrowly rounded at apex.

Crown black with a median postapical elongate spot and a broad transverse basal band of varying width and extending anteriorly on each side along inner eye margin, ivory; pronotum black, with a few small pale spots near anterior margin or more numerous and occurring over disk, posterior and humeral margins with a blue border; scutellum black, lateral margins and variable additional markings tan; forewing dark, finely maculate with paler except broad costal stripe and a stripe in brachial cell, which are blue to yellow (type with costal stripe yellow); face black except variable sparse yellow spots on clypeus, and yellow lateral portions of clypeus continuing to laterobasal portions of clypellus and area beneath each antenna; thoracic pleura yellow above, black below; legs yellow except black anterior tibiae and tarsi.

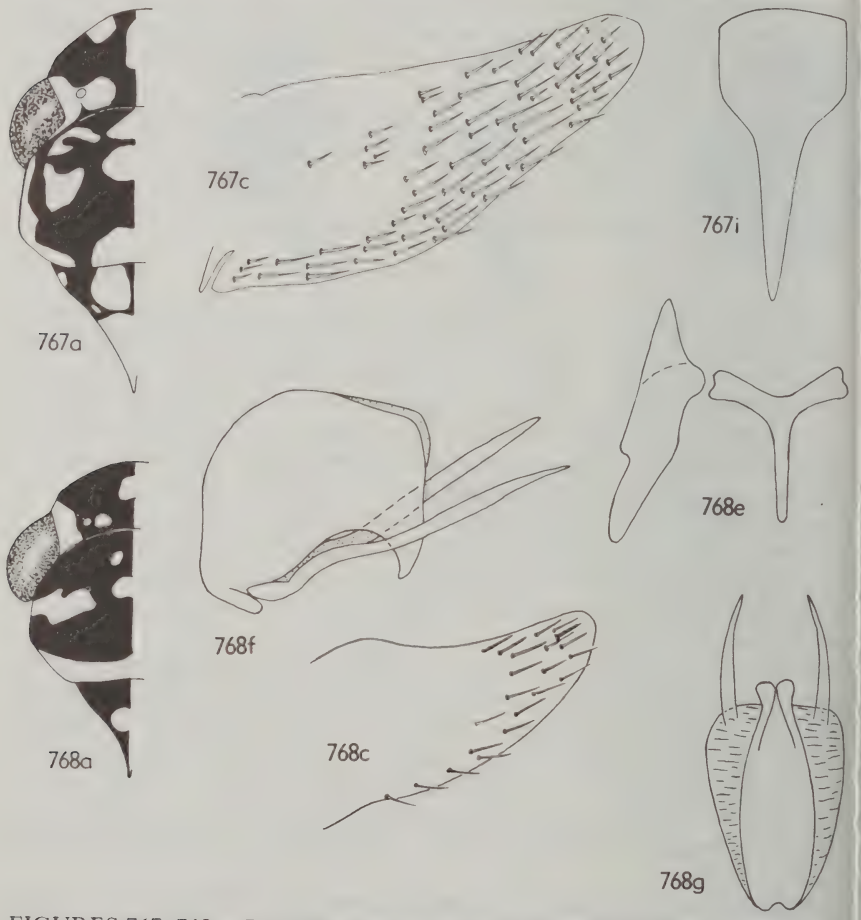
Holotype and one additional male, Colombia (L. Richter); one female, Colombia (NCS). One female Monterredondo, Prov. Cundinamarca, Colombia, 1420 m., August 20, 1951 (Pater B. Schneble) (SSM). Holotype on indefinite loan to USNM.

M. limitatula, n. sp., is very close to *M. leucomelas* (Walker), but is distinctive in the color markings of the forewings. The male genital structures and abdominal sternum VII of the female are as in the accompanying illustrations of *leucomelas*. *M. leucomelas* is quite variable in color, but I have not seen specimens within its range of variability comparable to *limitatula*.

Macugonalia andipa, NEW SPECIES

FIGURE 765, PAGE 948

Length of male 8.8-9.6 mm, of female 9.4-10.0 mm. Head with median length of crown from slightly less than four-tenths to one-half interocular width, and from one-fourth to one-third transocular width; clypeus slightly



FIGURES 767, 768.—767, *Macugonalia spinolai* (Signoret) (from specimens from southern Brazil; plate not shown in *c*). 768, *M. redundans* (Fowler) (*a* from specimen from Mexico; remainder from Rosario, Cuzcatlán, El Salvador; plate not shown in *c*).

convex medially and with vermiculate rugae. Thorax with posterior pronotal margin shallowly concave; forewing with at least inner apical cell membranous, remainder of membrane variable. Male pygofer with apex narrowly rounded; plates with macrosetae in a regular row; styles rounded apically. Female abdominal sternum VII well produced, acute apically, depressed on disk, much as in *M. sobrina* (Stål) (fig. 774*i*).

Crown orange with a broad Y-shaped black marking touching basal margin and extending onto clypeus, apex orange; pronotum narrowly black near anterior margin, remainder obscurely brownish mottled with paler, with (type) or without an orange marginal area behind each eye; scutellum black with lateral margins and variable markings on disk, orange; forewing dull red; face orange with a broad Y-shaped mark on clypeus and clypellus, clypeal median area between arms of "Y" orange; thoracic pleura orange above, black in lower portions; legs dull orange to stramineous.

Holotype and one additional male and four females, Bogotá [Colombia] (RMS). One female and two males, Pandi, Cundinamarca, Colombia (W. Fritsche, seller), October 10, 1913 (MMB); and two males and two females with identical data (ZIMH). One specimen without abdomen (ZIL).

M. andipa, n. sp., is distinctive in the color pattern of the crown and face. The length of the female abdominal sternum VII is intermediate between *M. moesta* (Fabricius) (fig. 762*i*) and *M. spinolai* (Signoret) (fig. 767*i*).

Macugonalia contristata, NEW SPECIES

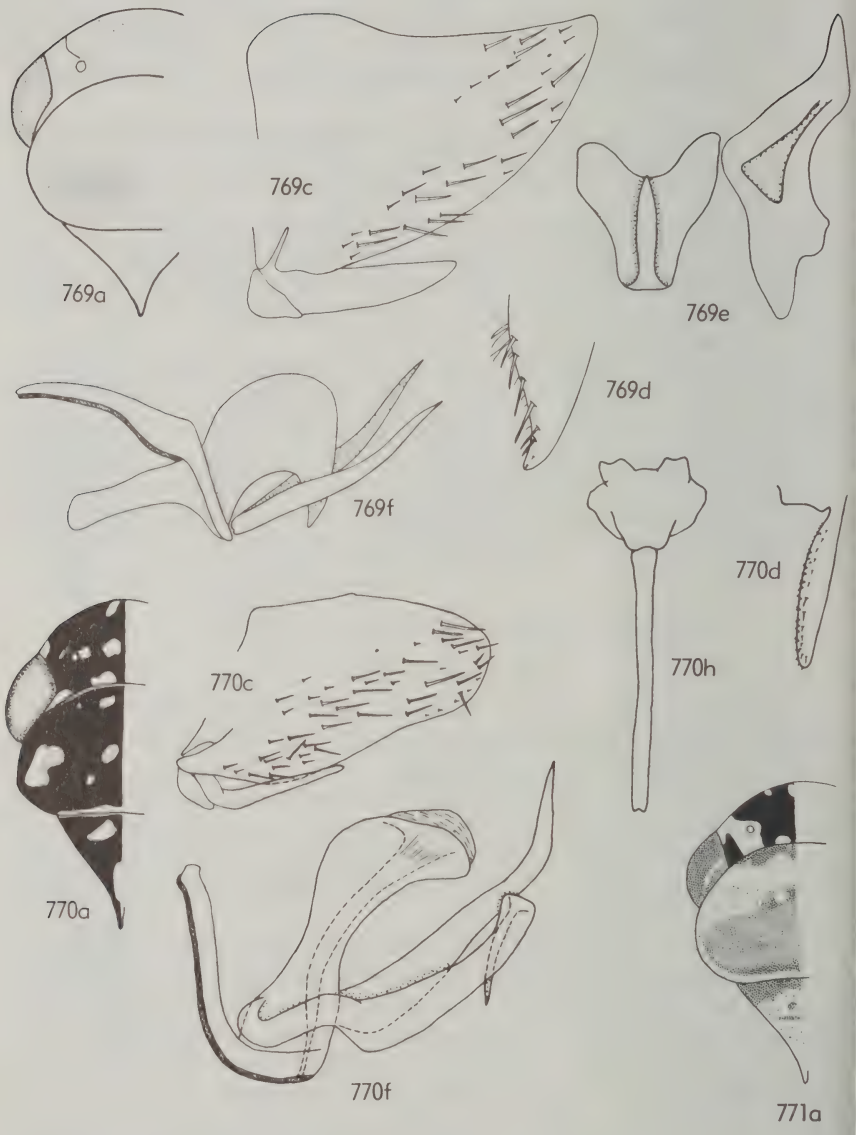
FIGURE 769, PAGE 952

Length 6.7-7.2 mm. Head with median length of crown from one-third to slightly more than four-tenths interocular width and from one-fifth to slightly more than one-fourth transocular width; clypeus flattened medially and obscurely vermiculately rugose. Thorax with posterior margin varying from slightly concave to slightly convex; forewing with membrane including all of apical cells. Male pygofer with apex angulate; plates with macrosetae in a regular row; style rounded apically. Female abdominal sternum VII much as in *M. leucomelas* (Walker) (fig. 766*i*).

Crown, pronotum, and scutellum sordid yellow with a poorly delimited arcuate blue band across pronotum connected at its extremities with a similar band on posterior margin; forewing dull green with a blue stripe in brachial cell and a narrower blue line along humeral margin and extending a short distance posteriorly along commissural margin of clavus; face and thoracic pleura dull yellow, with a median dark line on clypellus.

Holotype and two additional males and three females, Rio Caraguata, Mato Grosso, Brazil, February, 1953 (F. Plaumann) (NCS). Two females, Lago Feia, near Formosa, Goias, Brazil, April 25, 1972 (L. Knutson) (Kansas State University). Holotype on indefinite loan to USNM.

The form of the female abdominal sternum VII suggests a relationship to *M. leucomelas,* but specimens of *contristata* are more robust, and marked quite differently.



FIGURES 769-771.—769, *Macugonalia contristata*, n. sp. (*a* from Lago Feia, Goias, Brazil; remainder from holotype). 770, *M. fritilla*, n. sp. (*a* from specimen from Caracas, Venezuela; remainder from holotype; *h* from dorsal view). 771, *M. hilarula*, n. sp. (from specimen from Alto Palmar, Bolivia).

Macugonalia fritilla, NEW SPECIES

FIGURE 770, PAGE 952

Length of male 5.7 mm, of female 6.0 mm. Head with median length of crown approximately six-tenths interocular width and one-third or slightly more than one-third transocular width; clypeus flattened medially and varying from granular to coarsely punctate. Thorax with posterior pronotal margin weakly concave; forewing with membrane including more than apical cells but not sharply delimited basally. Male pygofer with apex broadly rounded; plates longer than usual for genus, constricted near base, the slender apical portion bearing irregularly arranged microsetae; aedeagus narrower than usual for genus and with processes asymmetrical apically, paraphysis slender, elongate, unbranched, median. Female abdominal sternum VII strongly produced and acute apically (much as in *M. spinolai* (fig. 767*i*)).

Color of crown, pronotum, and scutellum dark brown to black; crown with two pairs of spots near midline, a pair of larger, parentheses-shaped apical spots, a small spot at inner border of each ocellus, a line behind each eye, a spot near outer margin of each ocellus, and a spot bordering anterior eye angle, ivory; pronotum with a pair of larger pale spots on disk and variable additional pale mottling; forewing concolorous with pronotum, with a larger pale corial spot near midlength of claval suture and two pale spots in corium opposite claval apex, with additional very small spots in clavus and in area of corium between larger spots; face pale with longitudinal yellow lines on clypeus, and with or without (type) a large lobate yellow spot near clypeal apex; a spot on each side of clypellus, a spot on gena above lorum on each side and a narrow line along posterior margin of each gena, yellow; propleura mostly black; legs stramineous.

Holotype male, "Chapada, Campos" [Campos do Chapada, NE. Brazil], and one female, Caracas, Venezuela, August-September, 1949 (A. Mirsa) (USNM).

The male genitalia, with the paraphysis long and slender (at most a vestigial V-shaped sclerite in other species of the genus), and the constricted male plates set *M. fritilla* well apart from other species of *Macugonalia*.

Macugonalia hilarula, NEW SPECIES

FIGURE 771, PAGE 952

Length of male 7.1-7.5 mm. Head with median length of crown from three-tenths to more than one-third interocular width, and approximately one-fifth transocular width; clypeus weakly convex medially and with vermiculate rugae. Thorax with posterior pronotal margin weakly concave; forewing with inner apical cell and apical portions of remaining apical cells membranous. Male pygofer with apex narrowly rounded; plates with macrosetae in a regular row; styles rounded apically. Female unknown.

Crown black with a median postapical spot, a large spot surrounding each ocellus, and a pair of smaller spots on posterior margin near median line, yellow; pronotum coppery, anterior half paler (type) or not, posterior and

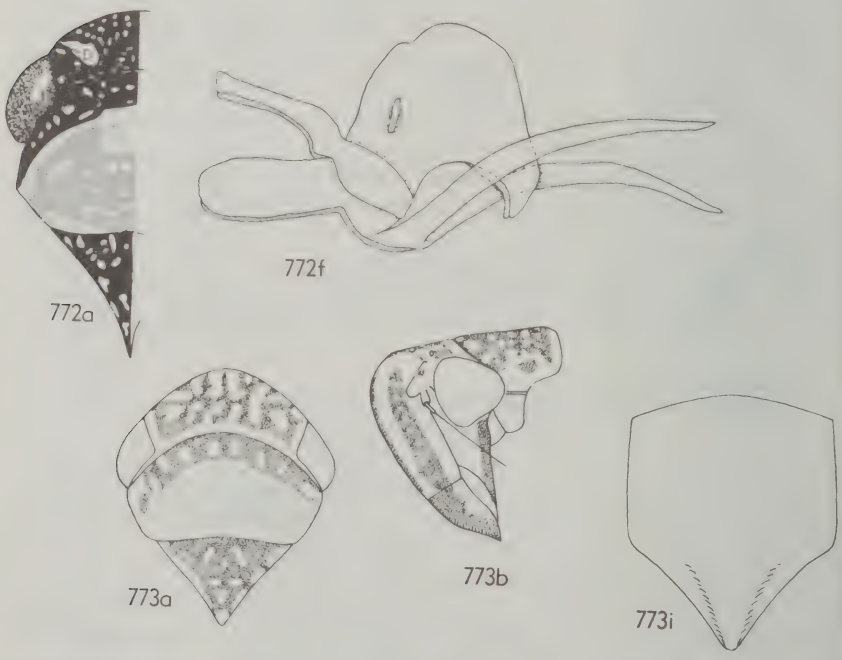
humeral margins bordered with blue and with two or more bluish spots before middle of disk, forewing red, with numerous small pale spots; face black, clypeus spotted irregularly with orange, with a larger spot on each side of base of clypellus and a large spot on gena above lorum on each side, orange; upper portion of proepimeron and a spot on mesepimeron ivory to orange, remainder of thoracic pleura castaneous to black.

Holotype male, El Palmar, Bolivia, "September-October", 1948 (L. E. Pena) (NCS). One male Irupana, Bolivia, April 29, 1947 (Raul Perez) (USNM). Thirty-four males, Alto Palmar, Dept. Cochabamba, Bolivia, Prov. Chapare, 2500 feet, October 23, 1959 (R.B. Cumming) at black light (SPBF).

M. hilarula, n. sp., is closely related to *M. leucomelas* (Walker) from which it may be separated by the characters of the key, above. *M. hilarula* is larger, also, than *leucomelas* (5.6-6.8 mm in length), and the finely maculate red forewings do not occur in *leucomelas*.

Macugonalia chanchama, NEW SPECIES

Length 7.5-7.6 mm. Head with median length of crown from three-tenths to almost four-tenths interocular width and approximately one-fourth transocular width; clypeus slightly flattened medially and irregularly granulate.



FIGURES 772, 773.—772, *Macugonalia picta* (Distant) (*a* from specimen from Peru; *f* from Ecuador). 773, *M. tribunicia* (Berg) (from specimen from Buenos Aires, Argentina).

Thorax with posterior pronotal margin weakly concave; forewing with inner apical cell and apical portions of remaining apical cells membranous, but with membrane not sharply delimited basally. Male pygofer with apex narrowly rounded apically. Female abdominal sternum VII not strongly produced, rounded apically.

Anterior dorsum black with few small indistinct spots at posterior margin of crown and near anterior margin of pronotum; forewing black, broadly suffused with dull red near costal and apical margins; face black (with a dull

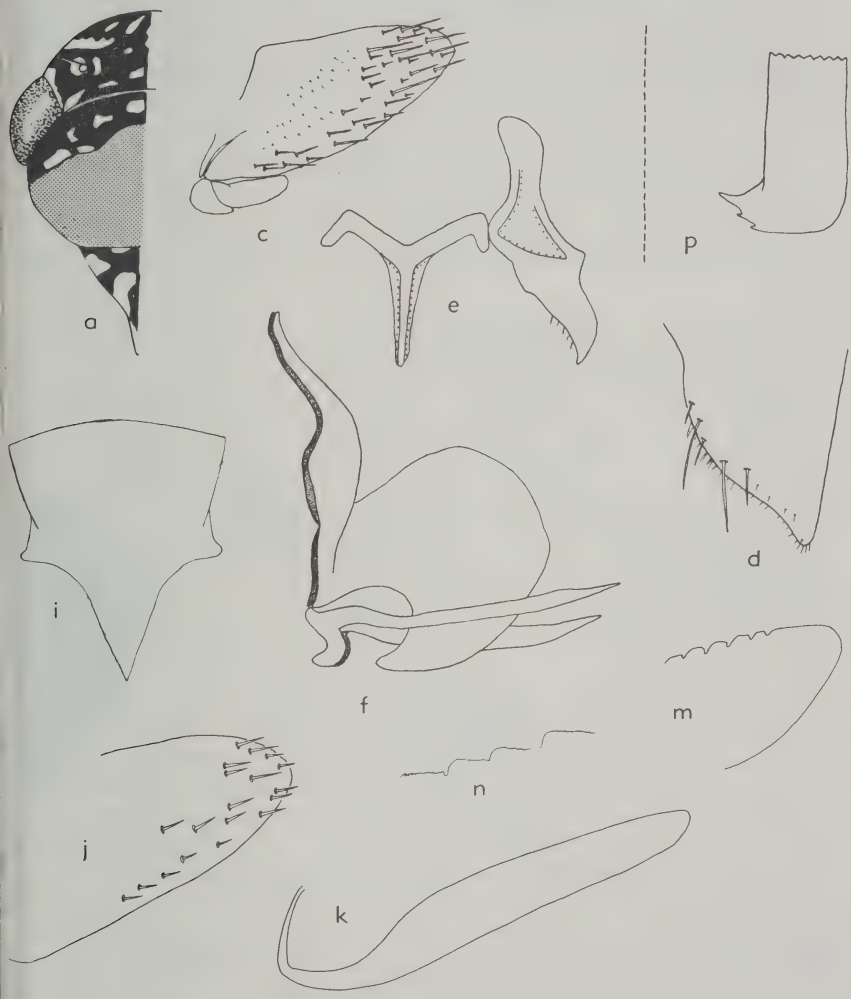


FIGURE 774.—*Macugonalia sobrina* (Stål) (*a* from specimen from Argentina; *i* from Misiones, Argentina; *j*, *k*, *m*, *n*, from Nova Teutonia, Brazil; remainder from Minas Gerais, Brazil): *p*, Male pygofer apex, right side, from dorsal view.

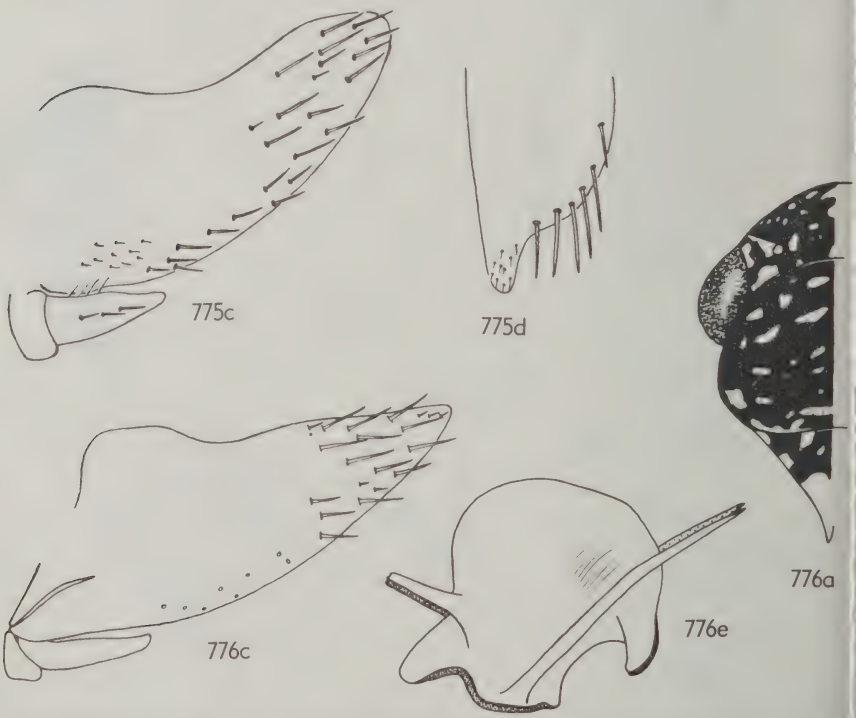
yellow subantennal spot in one specimen); pleurites of pro- and mesothorax ivory in their upper portion, remainder black; legs castaneous.

Holotype and one additional male, La Merced, Peru, August 22, 1973 (F. Hinostroza); one female, same locality, May 21, 1973 (J. Palomino) (USNM).

The relatively short lobe of the female abdominal sternum VII is similar to *M. leucomelas* (Walker), but the dark color and sparse markings of *chanchama* serve to distinguish it.

Macugonalia umbrosa, NEW SPECIES

Length of male 7.7-7.9 mm, of female 8.5-9.1 mm. Head with median length of crown from four-tenths to one-half interocular width and from one-fourth to less than one-third transocular width; clypeus flattened medially. Thorax with posterior pronotal margin slightly concave; forewing with all of inner three apical cells membranous, apical portion of fourth apical cell membranous. Male pygofer with apex narrowly rounded; plates with macrosetae in a regular row; style subtruncate apically. Female abdominal sternum VII strongly produced posteriorly, concealing more than half of ovipositor, apex acute.



FIGURES 775, 776.—775, *Macugonalia testudinaria* (Fowler) (from specimen from Trinidad, British West Indies). 776, *M. cavifrons* (Stål) (*a* from specimen from Brazil; remainder from Peru).

Color of dorsum, including forewings, black with numerous spots yellow to greenish-yellow, not forming a regular pattern nor larger yellow areas, the mottling of the crown continuing over clypeus and clypellus as a broad median vertical stripe which is black at its edges; posterior margins of genae narrowly black, remainder of face yellow; pro- and metepisternum black, remainder of thoracic pleura yellow.

Holotype male and fifteen additional specimens of both sexes. Bogotá, Colombia (Lindig) (RMS).

M. umbrosa, n. sp., is most closely related to *M. contaminata* (Fabricius) but differs in that it is definitely black marked with pale on anterior dorsum, whereas in the Fabrician species the proportions are so equally balanced that it would be difficult to say that they were either black marked with pale or pale marked with black.

129. AMBIGONALIA, NEW GENUS

FIGURE 777

Type-species: *Tettigonia varicolor* Signoret (1854a:15)

Length 7.5-9.3 mm.

Head slightly produced with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly more than six-tenths to three-fourths interocular width and from slightly less than four-tenths to slightly less than one-half transocular width, without a carina at transition from crown to face, ocelli in line with anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown convex and without a transverse concavity, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and rectilinear; clypeus slightly flattened medially, muscle impressions not very distinct, transclypeal suture obscure medially, clypellus with profile continuing contour of remainder of face.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, posterior margin concave, disk not sculptured, not pubescent. Forewing with membrane not clearly delimited, veins not very distinct, with three closed anteapical cells of which the bases are almost in a transverse line with claval apex, with four apical cells of which base of outermost is more proximal than base of third; forewings of female exceeding apex of ovipositor. Hindlegs with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, with apex convex, with numerous macrosetae on apical half and extending anteroventrally near ventral margin. Plates short triangular, with microsetae only. Style extending posteriorly as far as apex of connective, narrowly rounded apically, with a lateral lobe near midlength. Connective Y-shaped with arms widely divergent. Aedeagus short, expanded and membranous apically. Paraphyses short-stalked, rami long, slender, and tapering to acute apices.

Female abdominal sternum VII with a median posterior projection that is narrowly rounded apically. Ovipositor with second valvulae each broadened beyond basal curvature, with quadrate teeth extending from base of broadened portion almost to apex, the anteapical teeth progressively smaller, apex narrowly rounded, without anteapical denticles on dorsoapical or ventroapical margins. Pygofer with a group of macrosetae on apical third and extending anteroventrally near margin.

The female second valvulae and pygofer are not illustrated. The shape of the second valvula is near the illustration of *Acrulogonia sparsa,* n. sp. (fig. 535*m*) but the apex is more acute in *Ambigonalia varicolor* (Signoret).

Signoret described *Tettigonia varicolor* from specimens from Honolulu. I dissected the male lectotype and illustrated the genitalia, but noted that the genitalia might be abnormal because of the membranous apex of the aedeagus. Dr. Kramer identified specimens, using Signoret's figure, from Olmos, Lambayeque, Peru as *varicolor* and sent them to me, recently. The male genitalia were nearly identical with my illustrations of the lectotype. I have seen no other specimens from Hawaii. If the two specimens in NMV are not mislabeled, the distribution of the genus is very puzzling.

Ambigonalia is close to *Macugonalia,* new genus, but is not closely mottled as are species of the latter. The head is more produced in *Ambigonalia* than in *Macugonalia* and the males lack macrosetae on the plates, but have paraphyses, differing in these characters from *Macugonalia.*

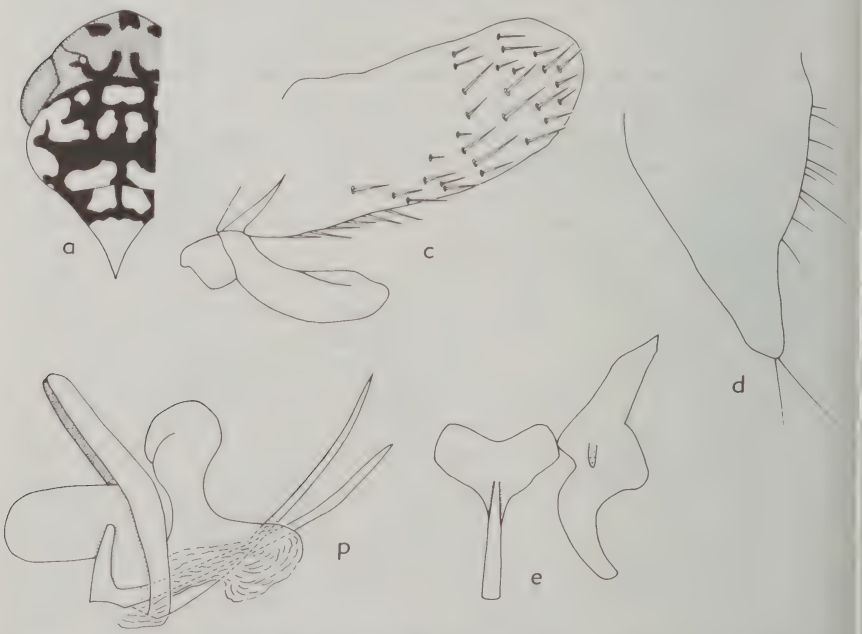


FIGURE 777.—*Ambigonalia varicolor* (Signoret) (*a* from specimen from Olmos, Peru; remainder from lectotype): *p,* Aedeagus and paraphyses, from lateral view.

130. CAMAIJA, NEW GENUS

FIGURES 778-781

Type-species: *C. veneris,* new species.

Length 4.0-9.1 mm.

Head moderately produced, anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than one-half to approximately three-fourths interocular width, and from one-fourth to one-half transocular width, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each usually closer to median line of crown than to adjacent anterior eye angle, crown with disk varying interspecifically from convex to slightly concave between ocelli, without a median fovea, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins almost vertical, concave; face with or without (varying interspecifically) a vertical lenticular sclerite bordering lateral clypeal suture on each side, clypeus scarcely or distinctly flattened medially, muscle impressions distinct or not; transclypeal suture complete or obsolete at middle, clypellus not produced, its profile continuing profile of clypeus (*C. trivialis,* n. sp.) or with its lower portion more nearly parallel to long axis of body.

Thorax with pronotal width greater or less than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin slightly concave, disk transversely striate or not (*trivialis*), without pubescence; scutellum not transversely striate behind transverse sulcus. Forewing with membrane present, extent varying interspecifically, with three closed anteapical cells, their bases approximately equidistant from wing base, with four apical cells, the base of the fourth more proximal than base of third (apparently not so in some specimens of *veneris,* n. sp., because of supernumerary crossvein in outer apical cell), without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1, first tarsomere approximately equal in length to combined length of two more distal tarsomeres, with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly, apex varying specifically from regularly convex to strongly convex; macrosetae occuring on apical one-third, pygofer processes absent. Plates narrow, triangular, not extending posteriorly as far as pygofer apex, with a single row of macrosetae. Style extending posteriorly almost as far as apex of connective, without a preapical lobe; apex truncate or obliquely truncate. Connective Y-shaped, stem much longer than strongly diverging arms. Aedeagus with shaft directed posterodorsally, without processes or with very short ones. Paraphyses elongate, ramus unbranched, not in median plane.

Female abdominal sternum VII produced posteriorly, posterior margin with a shallow, narrow, median, apical concavity. Ovipositor with second valvulae each broadened beyond basal curvature and bearing quadrate primary teeth on dorsal margin, with numerous small denticles on and between primary teeth, with numerous anteapical dorsal and ventral denticles; apex narrowly

curved to angulate. Pygofer narrowed and almost angulate posterodorsally, with few (*trivialis*) to many (*veneris*) setae on posterior half.

All of the species of *Camaija* occur in Jamaica. *Camaija* is related to *Caribovia*, new genus, but has the bases of all the anteapical cells located more distally than the claval apex. *Cuitlana*, new genus, has uniramous paraphyses similar to *Camaija*, but the aedeagus differs, and the bases of the anteapical cells of the forewing are proximal to the claval apex. *Camaija* is readily separated from *Cubrasa*, new genus, by the biramous paraphyses of the latter.

Species of *Camaija* differ greatly in size and color. I have seen specimens of *trivialis*, n. sp., which were collected on corn.

I have examined four specimens of *Tettigonia macrocephala* Van Duzee from CAS. Three are without abdomen. The fourth, a male, is here designated lectotype. It bears labels: "Montego Bay/Ja. Apr. '06" and "Van Duzee/ Collector" and "Lectotype/macrocephala". The genitalia are like *Camaija trivialis*, n. sp., except the aedeagus which is illustrated (fig. 780*f*).

SPECIES OF *CAMAIJA*

gryllsi, n. sp. Jamaica.
macrocephala (Van Duzee), 1907a:59 (*Tettigonia*). Jamaica. New combination.
trivialis, n. sp. Jamaica.
veneris, n. sp. Jamaica.

KEY TO SPECIES OF *CAMAIJA*

1. Length more than 8 mm, head black with small yellow markings ..... *veneris*, n. sp.
   Length less than 6.8 mm, head yellow with black markings 2
2. Interocellar area of crown with median line narrowly and a spot on each side of it, black ..... *trivialis*, n. sp., page 962
   Interocellar area of crown with a pair of longitudinal black lines, median line pale 3
3. Face with median black line very narrow, restricted to area near transclypeal suture; aedeagus in lateral view with ventral margin convex ..... *macrocephala* (Van Duzee) (fig. 780)
   Face with median line broader and extending through most of clypeus; aedeagus in lateral view with ventral margin concave ..... *gryllsi*, n. sp., page 964

Camaija veneris, NEW SPECIES

FIGURE 778

Length of male 8.1-8.4 mm, of female 9.1 mm. Head with median length of crown varying from slightly less than one-half to seven-tenths interocular width and from one-fourth to four-tenths transocular width, crown with disk slightly concave between ocelli; face usually without a lenticular sclerite bordering lateral clypeal suture on each side, clypeus distinctly flattened

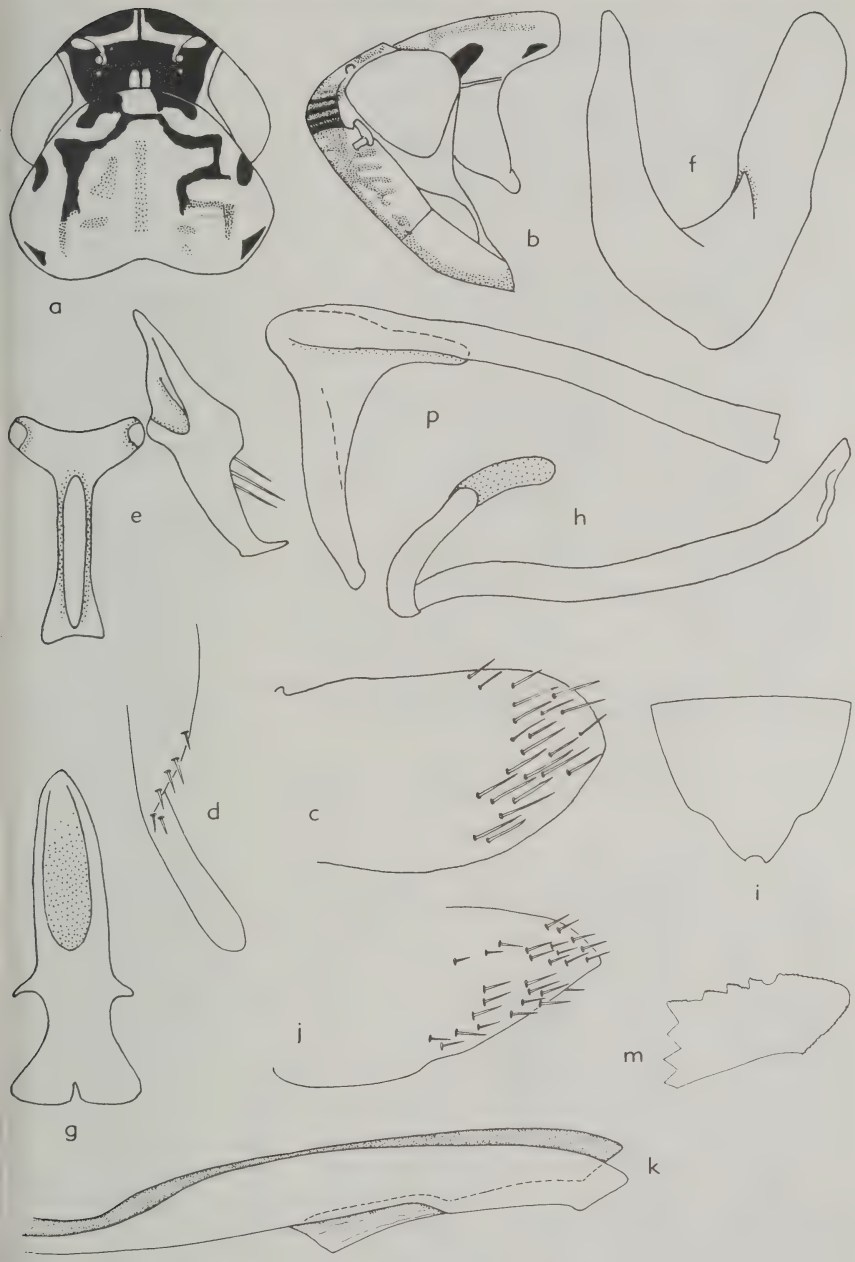


FIGURE 778.—*Camaija veneris,* n. sp. (specimens from St. Andrew Parish, Jamaica; plate not shown in *c; h* from lateral view; both valvulae shown in *k*): *p,* Paraphysis from ventral view.

medially, transclypeal suture obsolete at middle, clypellus with its apical portion, in profile, curved posteriorly and more nearly parallel to long axis of body than contour of clypeus and remainder of clypellus. Thorax with pronotal disk transversely rugose; forewing with membrane including inner three apical cells and apical portion of outer apical cell which has a supernumerary crossvein at base of its membranous portion. Male with pygofer setae more numerous than in *C. trivialis*, n. sp.; aedeagal shaft with a short angular process on each side near base; paraphyses with ramus truncate apically.

Crown black with narrow yellow markings that are variable, but are constant in forming an inverted "V" at apex, a pair of slender, approximate spots near middle of base, and a narrow stripe at inner margin of each eye, pronotum olive marked generously and variably with black; forewings olive green tinged with tan, veins black except bases of apical cells which are red; clypeus mostly, and clypellus black medially, with sides of clypellus broadly and a number of variable markings on clypeus dull yellow; legs and thoracic pleura and venter variable; abdominal venter red.

Holotype male and one female, St. Andrew Parish, Hardwar Gap, Dicks Pond Trail, July 25, 1962, Jamaica, B.W.I. (Farr, O. & R. Flint) (USNM); one female, Portland, Hardwar Gap, Jamaica, B.W.I., August 3, 1958 (T. H. Farr) (in Farr collection); one male St. Andrew, Morces Gap, Jamaica, August 23, 1950 (R. P. Bengry) (BM); one female, "Cinchona", Jamaica, July 25, 1923, No. 1316 (C. C. Gowdey) (BM).

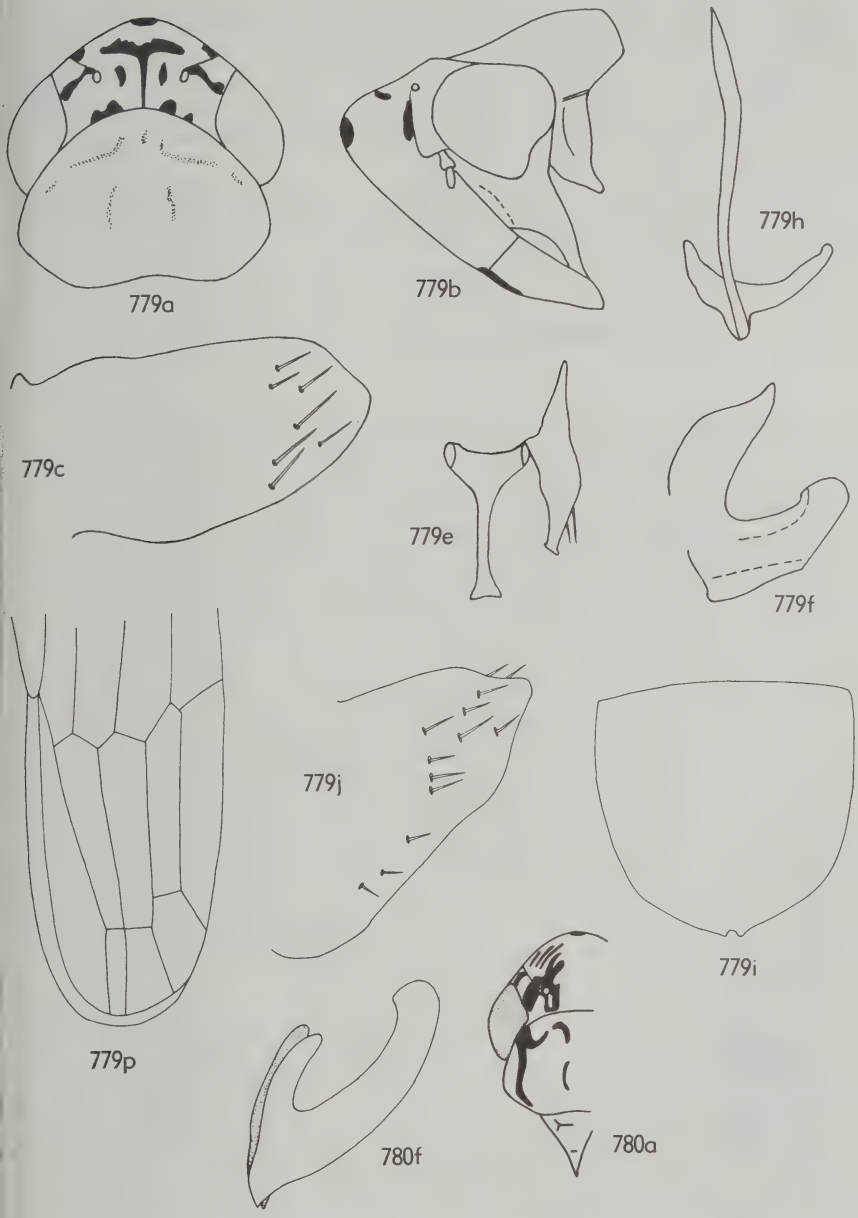
C. veneris, n. sp., may be distinguished from *C. trivialis*, n. sp., in a number of ways, including those used in the above key.

Camaija trivialis, NEW SPECIES

FIGURE 799, PAGE 963

Length of male 4.8 mm, of female 4.0 mm. Head with median length of crown varying from slightly more than six-tenths to two-thirds interocular width and from one-third to four-tenths transocular width, crown with disk convex between ocelli; face with a lenticular sclerite bordering lateral clypeal suture on each side, clypeus not flattened medially, transclypeal suture entire, clypellus with its apical portion, in profile, continuing contour of clypeus. Thorax with pronotal disk not sculptured; forewing with membrane including all of inner apical cell and apical half of adjoining second apical cell, outer apical cell without a crossvein. Male with pygofer setae few and sparse; aedeagal shaft without processes; paraphyses with ramus acute apically.

Anterior margin of head with a median and a lateral black spot along lateral clypeal suture, on each side; crown yellowish-green, with a median T-shaped mark, a slender oblique marking extending from ocellus to inner eye margin on each side, a small mark on each side between ocellus and median line, with one or a pair of small spots bordering hind margin on each side, black; pronotum with anterior portion yellowish-green with a pair of weak, angular, black marks, remainder of pronotum green; additional black markings present (see fig. 779*a*) or absent; scutellum concolorous with crown, with



FIGURES 779, 780.—779, *Camaija trivialis,* n. sp. (*i, j,* from topotype; remainder from holotype; plate not shown in *c; h* from caudoventral view): *p,* Apex of forewing, *in situ.* 780, *C. macrocephala* (Van Duzee), lectotype.

a black transverse oval-shaped design on basal half; forewings dark green with most veins black, remainder pale yellow; face yellow, clypellus with a narrow median black stripe at base.

Holotype and one additional male, and one female, all on same pin, from corn, Puss Gap, St. Thomas, Jamaica, B.W.I., "c 2060", November 14, 1946 (G. R. Thompson) (USNM). The holotype is the topmost of the three specimens and has a forewing missing.

Camaija veneris and *C. trivialis* may be separated by the characters used in the key. *C. trivialis* is very near *C. gryllsi,* n. sp., in the discussion of which specific differences are noted.

Camaija gryllsi, NEW SPECIES

FIGURE 781

Length of male 5.6 mm, of female 6.4-6.7 mm. Head with median length of crown varying from seven-tenths to more than three-fourths interocular width and from one-half to six-tenths transocular width, crown with disk not concave between ocelli; face with a lenticular sclerite bordering lateral clypeal suture on each side, clypeus slightly flattened medially, transclypeal suture entire, clypellus as in *C. veneris,* n. sp. Thorax with pronotal disk transversely rugose; forewing with all apical cells coriaceous basally but membranous in more than apical half. Male genitalia as in *C. trivialis,* n. sp., but with aedeagal shaft longer in proportion to length of dorsal apodemes and with a pair of very small retrorse ventral acute processes near base of shaft.

Head, anterior portion of pronotum, and all of scutellum tan, remainder of pronotum green; with dark lines delimiting a median area that is somewhat sagittate, with a median apical and two dark spots on each ocellocular area; pronotum with four narrow longitudinal lines, variably distinct; scutellum with a pair of lines arising near middle of base, diverging posteriorly and ending at transverse sulcus; forewings colored as in *trivialis;* face with a broad median black line extending through clypeus and onto clypellus, upper muscle impressions, remainder of face, thoracic pleura, and legs yellow.

Holotype male and two females, Pembroke Hall and Rio Nuevo, Jamaica, August 30, 1966 (N. E. Grylls) (USNM).

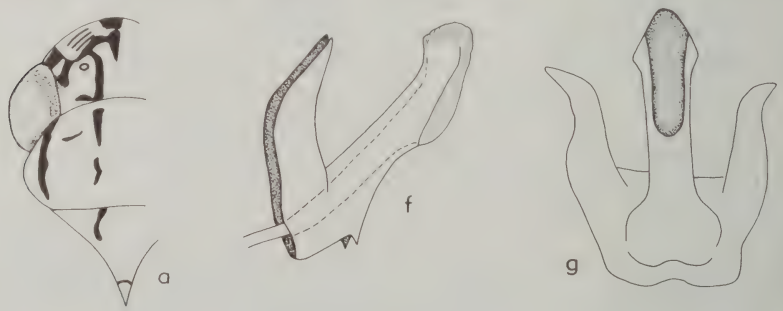


FIGURE 781.—*Camaija gryllsi,* n. sp., holotype.

C. gryllsi, n. sp., is very similar to *C. trivialis*, n. sp., and may be a form of the latter, but the differences in size, markings, and aedeagus, without known intergrades warrant their treatment as separate species at this time.

131. Genus **HADRIA** Metcalf and Bruner

Figures 782-794

Hadria Metcalf and Bruner, 1936a:945. Type-species: *Hadria convertibilis* Metcalf and Bruner, by original designation.

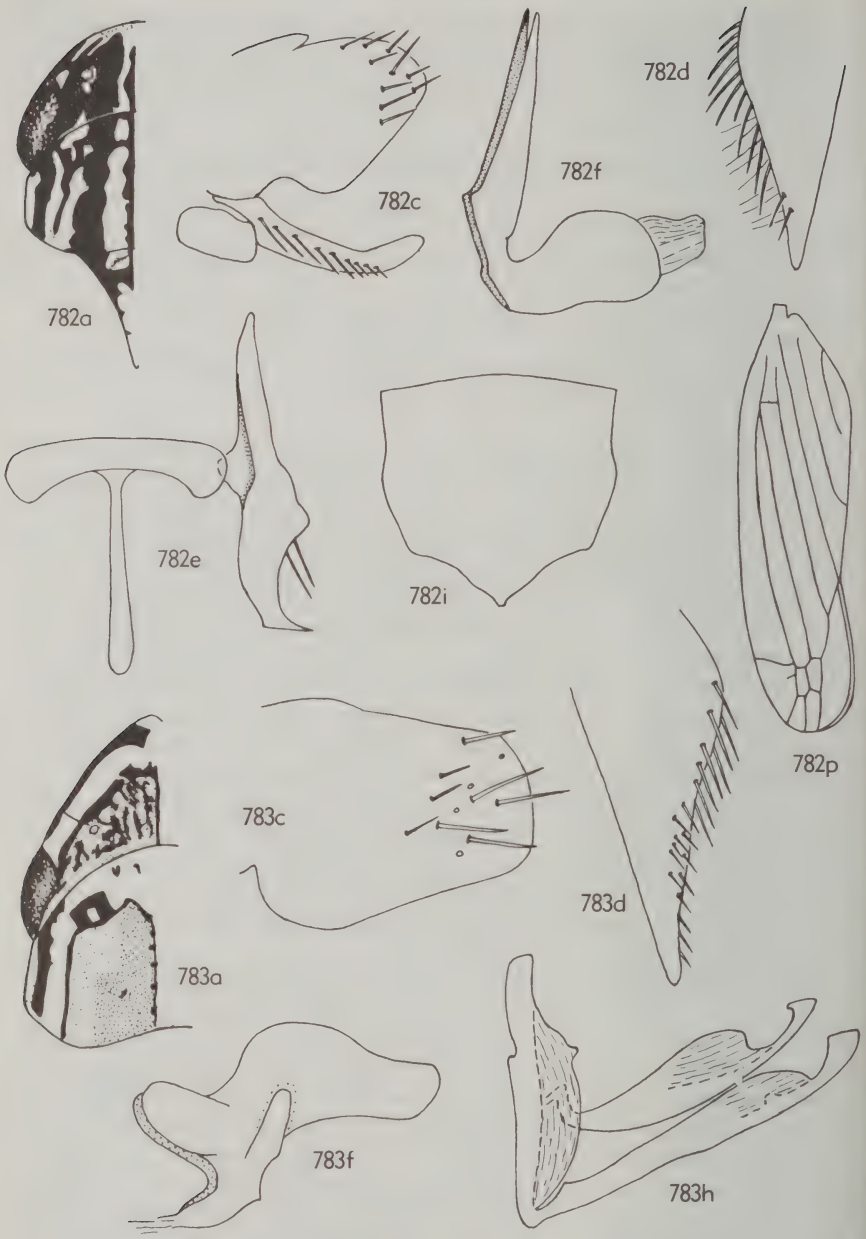
Arezzia Metcalf and Bruner, 1936a:957. Type-species: *Arezzia maestralis* Metcalf and Bruner, by original designation. New synonymy.

Lucumius Metcalf and Bruner, 1936a: 968. Type-species: *Lucumius triangularis* Metcalf and Bruner, by original designation. New synonymy.

Length 5.2-8.4 mm.

Head moderately produced (exception: *H. maestralis* (Metcalf and Bruner)), median length of crown usually from four-tenths to slightly less than six-tenths interocular width (between three- and four-tenths in *maestralis*) and usually from slightly more than one-fourth to slightly less than four-tenths transocular width (approximately one-fifth in *maestralis*), without a carina at transition from crown to face, ocelli located slightly before, slightly behind, or on a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown usually convex, slightly flattened medially in some specimens, usually with a shallow transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins slightly oblique (almost vertical) and varying from rectilinear to slightly concave; face usually with a very slender subantennal sclerite bordering lateral clypeal suture on each side, clypeus convex or slightly flattened medially, muscle impressions usually distinct, transclypeal suture usually obsolete medially, clypellus not produced, its contour continuing profile of clypeus in its basal portion, apical portion usually lying in a plane more nearly horizontal.

Thorax with pronotal width varying from less than to greater than transocular width of head, lateral margins varying from parallel to each other, to slightly convergent anteriorly, disk without sculpturing except rarely (then with very weak transverse striae), without pubescence; scutellum not striate behind transverse sulcus. Forewing with membrane of variable extent, in most species including all of apical cells except basal portion of outer apical cell, but in some species more extensive and including anteapical cells, and in others less extensive and including only first, second, and apical portion of third apical cells, veins distinct but not elevated, with only two short closed anteapical cells of which the bases are well distad of a line drawn across wing through claval apex and perpendicular to long axis of wing, base of fourth apical cell much more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1; length of first tarsomere greater than combined length



FIGURES 782, 783.—782, *Hadria convertibilis* Metcalf and Bruner (*a* from specimen from Cuba; *i* from Oriente, Cuba; *p* from Camagüey, Cuba; remainder from Santiago de Cuba): *p*, Forewing. 783, *H. dominicana* (Dozier) (from specimen from Dominican Republic; plate not shown in *c*; *h* from lateral view).

of two more distal tarsomeres, and with two parallel rows of minute setae on plantar surface.

Male genitalia: Pygofer moderately produced posteriorly, apex varying from broadly rounded to narrowed and subacute, macrosetae from few to many, located on posterior half of disk and in most species on the dorsal portion of that region. Plates extending posteriorly as far as, or farther than pygofer apex, usually with uniseriate macrosetae (without macrosetae in *H. balloui* Metcalf and Bruner) and usually with a number of microsetae. Style extending posteriorly to a varying degree in comparison with connective, but never extending as far as apex of latter, truncate apically, with lateral lobe occuring almost opposite articulation with connective. Connective T- or Y-shaped with arms widely divergent. Aedeagus with shaft short, with or without processes, occurring near midlength when present. Paraphyses absent or present, symmetrical or not, in some species with only a single apical ramus.

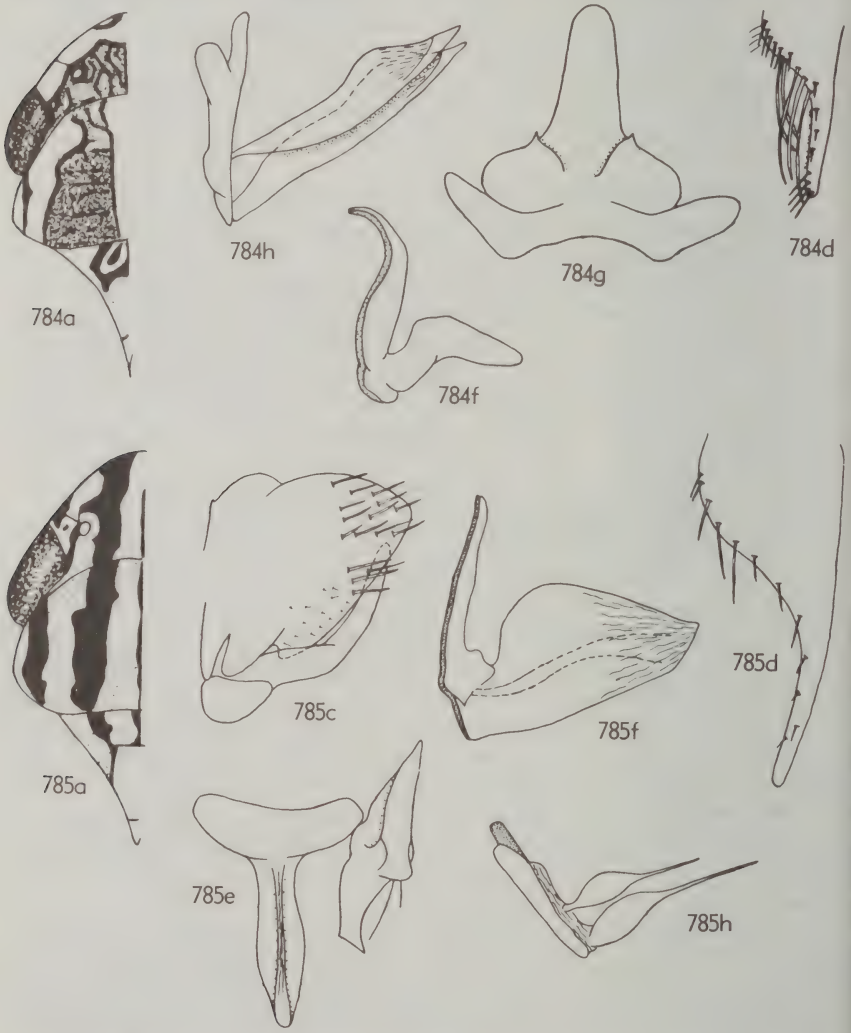
Female abdominal sternum VII with posterior margin moderately produced and rounded, angulate, or slightly concave at apex. Genital chamber without sclerites. Pygofer usually as in *Hortensia* (fig. 654*c*) (exception: *balloui,* in which the macrosetae are more numerous and more closely set and arranged differently). Ovipositor with second valvulae each expanded throughout portion beyond basal curvature and with large quadrate teeth usually extending almost to apex (exception: *H. trinitalis* Metcalf and Bruner) and bearing minute secondary denticles, with a number of anteapical dorsal denticulations, apex angulate or narrowly rounded, with or without an anteapical posteroventral angle.

Species of *Hadria* Metcalf and Bruner occur in Cuba, Haiti, and the Dominican Republic. *Hadria* is closely related to *Apogonalia* Evans, sharing with it the presence of the subantennal sclerite which rests along the lateral clypeal suture. The structure is usually less distinct than in *Apogonalia* and appears to be wanting in *H. maestralis* (Metcalf and Bruner) and obscure in some other species. The peculiar venation of the forewing, with its two very short anteapical cells both lying entirely more distal than the claval apex, will readily separate *Hadria* from other genera. Of the species moved to *Hadria,* from *Arezzia,* in the list below, there might be some hesitancy in following this disposition of *maestralis* (Metcalf and Bruner) which is the type-species of the nominal genus *Arezzia.* But the venation of the forewing of *maestralis* is like that described above for *Hadria,* and the genitalia of a male paratype of *maestralis* are so much similar to the present illustration of *H. trinitalis* Metcalf and Bruner that I cannot find specific differences (although I believe they are distinct species).

The present interpretation of *Hadria balloui* Metcalf and Bruner is based on paratypes of both sexes compared with the female holotype. *Arezzia baracoa* Metcalf and Bruner is known to me only from the male holotype, of which the forewings are missing, and from the allotype of which the abdomen and a fragment of the thorax bearing one hindwing are all that remain (I have not dissolved the balsam in the gelatin capsule in which the genitalia of the holotype are imbedded).

The present interpretation of *Hortensia conciliata* Metcalf and Bruner is based on the original illustration (1936a, plate III, fig. 6), on a specimen bearing the label "*Tettigonia conciliata* Uhler" in USNM, apparently a manuscript name, and on a male dissected before the latter was discovered.

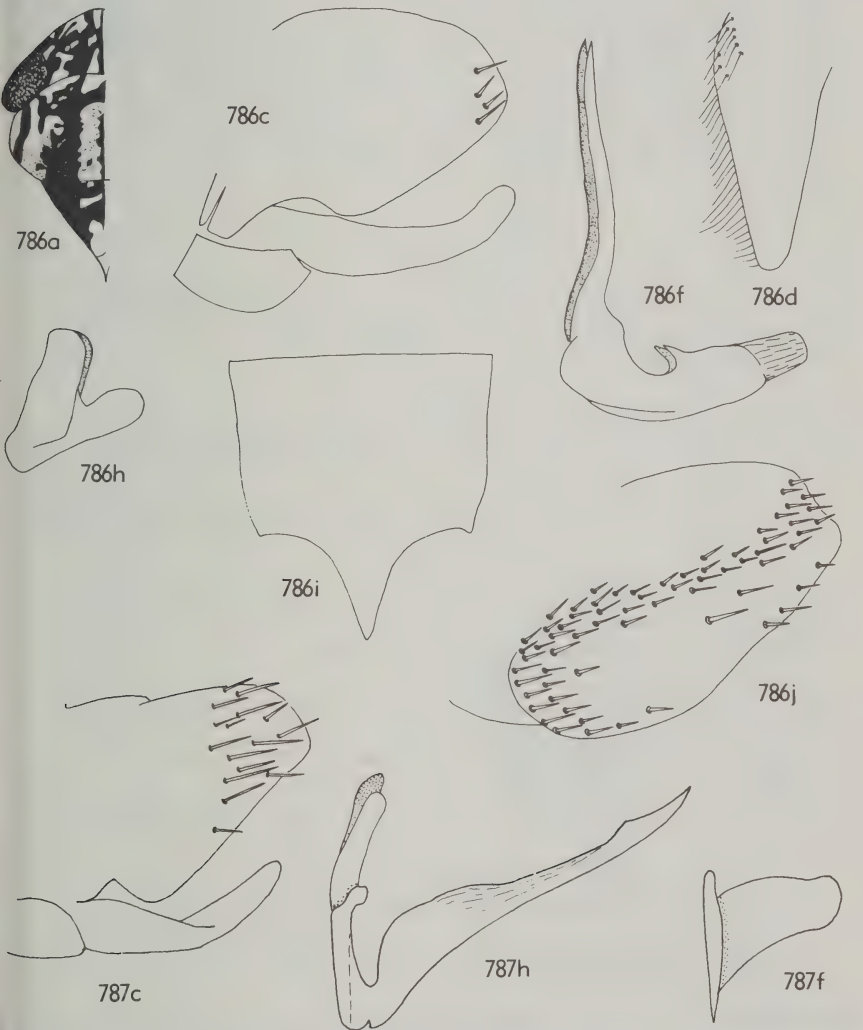
My interpretation of *Hadria convertibilis* Metcalf and Bruner is based on specimens of both sexes compared with the female holotype. *H. convertibilis* var. *roigi* Metcalf and Bruner is known to me only from the female holotype and from one additional specimen of which the abdomen is missing. *H. cubana*



FIGURES 784, 785.—784, *Hadria haitiensis* (Dozier) (*a* from specimen from Port au Prince, Haiti; remainder from Haiti; *h* from lateral view). 785, *H. omaja* (Metcalf and Bruner) (from specimen from Cuba; *h* from lateral view).

Metcalf and Bruner is known to me from a series of paratypes of both sexes compared with the holotype which is without an abdomen.

Hadria labyrinthica Metcalf and Bruner, as interpreted here, is based on the female holotype, the male allotype, and paratypes of both sexes. *Arezzia maestralis* Metcalf and Bruner is identified here in the sense of the female holotype and paratypes of both sexes. *A. omaja* Metcalf and Bruner is interpreted here on the basis of the female holotype and a pair of paratypes.



FIGURES 786, 787.—786, *Hadria balloui* Metcalf and Bruner (from specimens from Pico Turquino, Cuba; *h* from lateral view). 787, *H. conciliata* (Metcalf and Bruner) (from specimen from Cuba; *h* from lateral view).

Only the female holotype of *Hadria oteroi* Metcalf and Bruner has been available for this study. *Arezzia rangeliana* Metcalf and Bruner is determined on the basis of the female holotype, the allotype and one additional male.

Of the type-series of *Hadria anachoreta* Metcalf and Bruner, the female holotype is represented only by the abdomen, and the genitalia of the allotype were not dissolved from the balsam in which they are imbedded. A male paratype has genitalia like those of a male paratype of *H. trinitalis* Metcalf and Bruner which was compared with the female lectotype of the latter nominal species. Specimens from the type series of both nominal species are very similar externally. Also, some of the paratypes of *H. cubana* Metcalf and Bruner are conspecific with *trinitalis*. My interpretation of *Lucumius triangularis* Metcalf and Bruner, is based on an examination of the type.

Arezzia viridipennis Metcalf and Bruner is interpreted here in the sense of the female holotype and the male allotype, compared with the holotype.

I am indebted to Dr. James P. Kramer for helpful suggestions used in the following key.

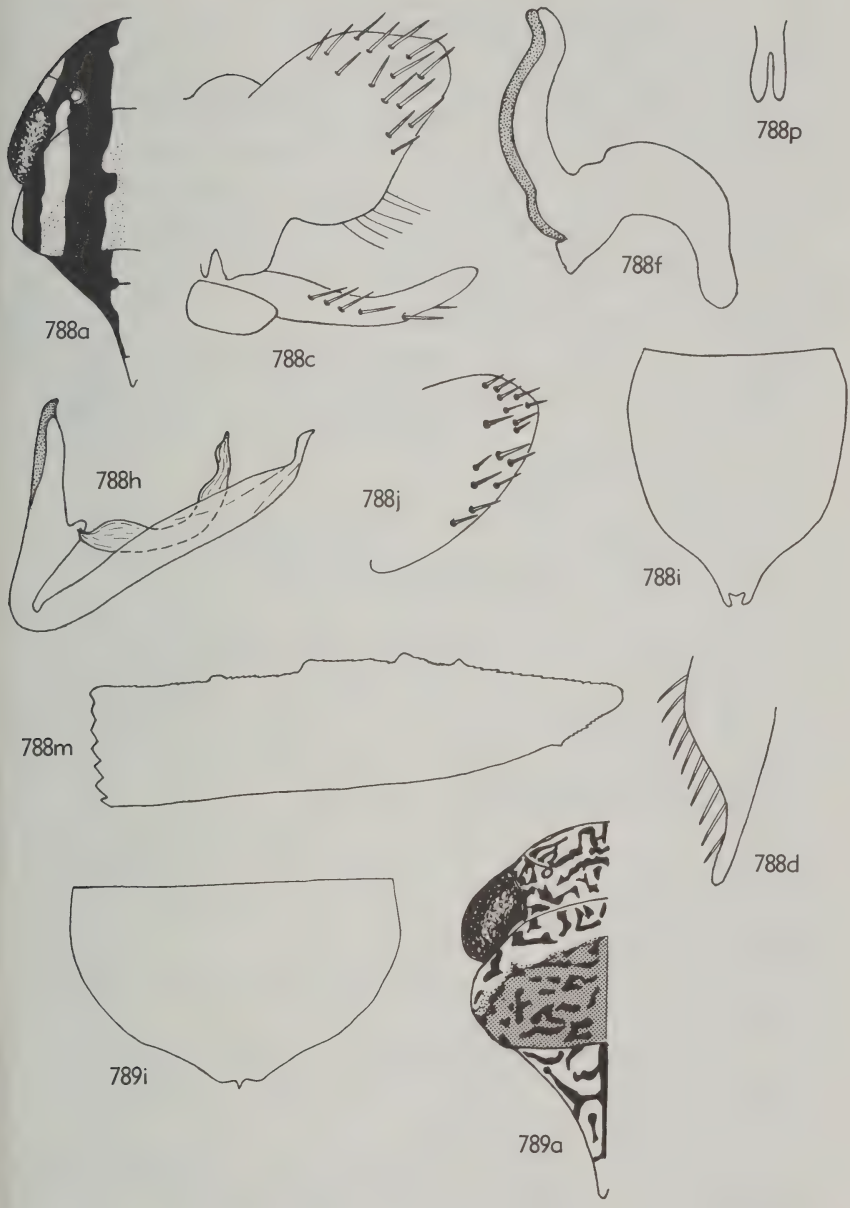
SPECIES OF *HADRIA*

balloui Metcalf and Bruner, 1936a:948. Cuba.
baracoa (Metcalf and Bruner), 1936a:962 (*Arezzia*). Cuba. New combination.
conciliata (Metcalf and Bruner), 1936a:932 (*Hortensia*). Cuba.
convertibilis Metcalf and Bruner, 1936a:945. Cuba.
var. *roigi* Metcalf and Bruner, 1936a:947. Cuba.
cubana Metcalf and Bruner, 1936a:955. Cuba.
dominicana (Dozier), 1931a:10 (*Graphocephala*). Dominican Republic. New combination.
haitiensis (Dozier), 1931a:9 (*Graphocephala*). Haiti, Dominican Republic. New combination.
hispaniola (Dozier), 1931a:8 (*Cicadella*). Haiti, Dominican Republic. New combination.
labyrinthica Metcalf and Bruner, 1936a:953. Cuba.
maestralis (Metcalf and Bruner), 1936a:957 (*Arezzia*). Cuba. New combination.
maldonadoi, n. sp. Dominican Republic.
omaja (Metcalf and Bruner), 1936a:959 (*Arezzia*). Cuba.
oteroi Metcalf and Bruner, 1936a:950. Cuba.
rangeliana (Metcalf and Bruner), 1936a:965 (*Arezzia*). Cuba. New combination.
trinitalis Metcalf and Bruner, 1936a:925. Cuba.
anachoreta (Metcalf and Bruner), 1936a:961 (*Arezzia*). New synonymy.
triangularis (Metcalf and Bruner), 1936a:968 (*Lucumius*).
viridipennis (Metcalf and Bruner), 1936a:964 (*Arezzia*). Cuba. New combination.

KEY TO SPECIES OF *HADRIA*

1. Pronotum with markings longitudinal, often continuing onto crown 2
   Pronotum without longitudinal markings or with very narrow ones 10

2. Pronotum with a pair of broad longitudinal wine-red stripes, narrowly separated by a median dull yellow stripe
   baracoa (Metcalf and Bruner)
   Not as above 3



FIGURES 788, 789.—788, *Hadria hispaniola* (Dozier) (*a, i, j, m,* from specimen from Dominican Republic; remainder from Haiti; *h* from lateral view): *p,* Apex of aedeagus, from caudal view. 789, *H. maestralis* (Metcalf and Bruner) (from specimen from Pico Turquino, Cuba).

3. Pronotum with longitudinal markings orange or red 4
   Pronotum with longitudinal markings black 5

4. Legs scarlet to sordid red; crown bordered anteriorly with scarlet; length of male at least 6.5 mm. ..... *dominicana* (Dozier) (fig. 783)
   Legs orange to pale brown; crown bordered anteriorly with orange; length of male 6 mm, or less ..... *haitiensis* (Dozier) (fig. 784)

5. Crown with a median uninterrupted black line extending through more than basal half of its length 6
   Crown without a median black line, or if present then not extending through more than basal half of crown 7

6. Median black line of crown percurrent
   convertibilis Metcalf and Bruner (fig. 782)
   Median black line of crown not attaining its apex
   omaja (Metcalf and Bruner) (fig. 785)

7. Clypeus with a dorsomedian black spot 8
   Clypeus without such a spot 9

8. Forewings tan with black veins and narrow vermiculate black markings in some of the cells ..... *rangeliana* (Metcalf and Bruner)
   Forewings black with blue markings
   balloui Metcalf and Bruner (fig. 786)

9. Crown with a pair of converging black lines on each side; disk of clypeus unmarked ..... *conciliata* (Metcalf and Bruner) (fig. 787)
   Crown with only one black line on each side, continuing across the disk of clypeus ..... *hispaniola* (Dozier) (fig. 788)

10. Forewings wine-red with bright yellow spots; crown bright yellow with dark markings delimiting large yellow spots
    oteroi Metcalf and Bruner
    Forewings not as above; crown sordid yellow, tan, or green with numerous narrow confluent black vermiculations not delimiting large spots 11

11. Length greater than 7.5 mm
    maestralis (Metcalf and Bruner) (fig. 789)
    Length less than 6.5 mm 12

12. Male pygofer with irregularly biseriate short peglike spines along caudoventral margin ..... *cubana* Metcalf and Bruner (fig. 790)
    Male pygofer not so 13

13. Face with a median conspicuous black spot above midlength of clypeus
    trinitalis Metcalf and Bruner (fig. 791)
    Face without such a median black spot or with spot reduced 14

14. Male genitalia without paraphyses
    labyrinthica Metcalf and Bruner (fig. 792)
    Male genitalia with paraphyses (bearing an unpaired ramus) 15

15. Basal two-thirds of scutellum mostly white; forewings without black veins; upper portion of face without black spots
viridipennis (Metcalf and Bruner) (fig. 793)
Scutellum not so; forewings with longitudinal veins black; upper portion of face usually with few black spots ..... *maldonadoi*, n. sp., page 974

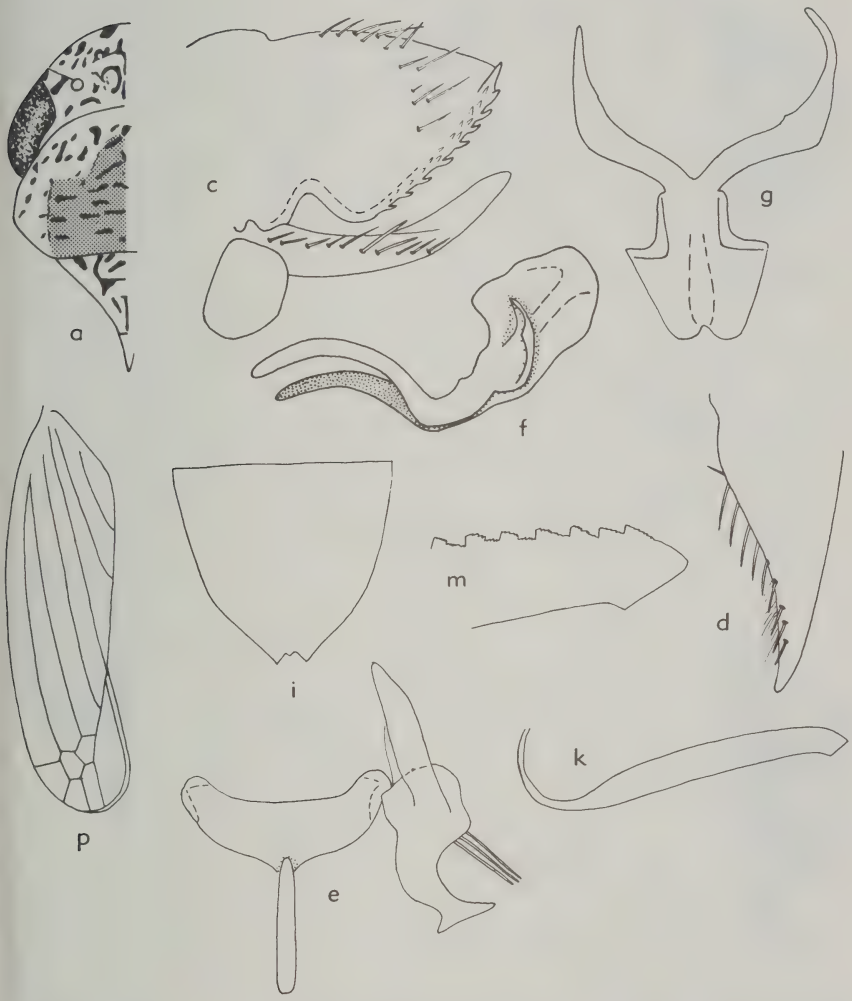
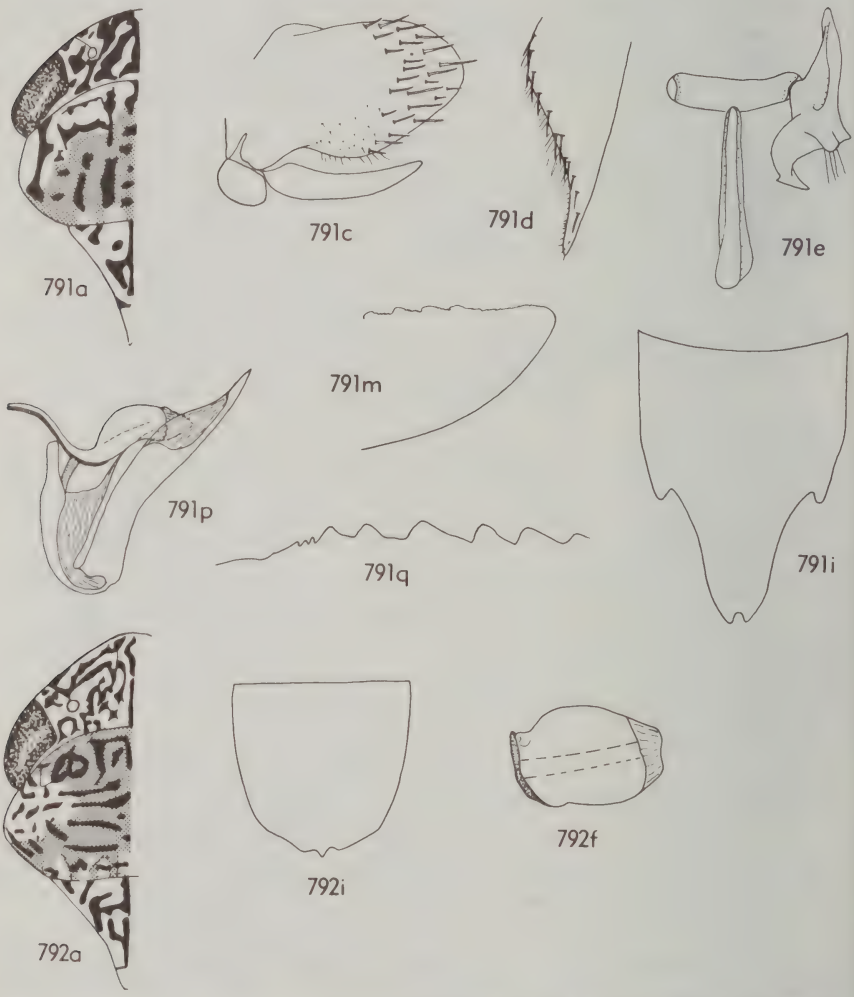


FIGURE 790.—*Hadria cubana* Metcalf and Bruner (*i, k, m,* from specimen from Taco Taco, Cuba; *p* from Bainoa, Cuba; remainder from Cuba): *p,* Forewing.

Hadria maldonadoi, NEW SPECIES

FIGURE 794, PAGE 976

Length of male 5.2-5.4 mm. Head with median length of crown from slightly more than four-tenths to less than six-tenths interocular width and from slightly less than three-tenths to one-third transocular width; ocelli



FIGURES 791, 792.—791, *Hadria trinitalis* Metcalf and Bruner (*a* from specimen from Buenos Aires, Cuba; *i, m, q,* from Oriente, Cuba; remainder from Cuba): *p,* Aedeagus and paraphyses, from lateral view; *q,* basalmost teeth of second valvula. 792, *H. labyrinthica* Metcalf and Bruner (*i* from specimen from Santiago de Cuba; remainder from Cuba; only aedeagal shaft shown in *f*).

located on a line between anterior eye angles, crown convex, without a transverse concavity across ocelli, antennal ledges in lateral view with anterior margins slightly concave, subantennal sclerite distinct, transclypeal suture obsolete medially, contour of apical portion of clypeus more nearly horizontal than remainder of face. Thorax with pronotal width less than transocular width of head, lateral margins slightly convergent anteriorly; forewing with membrane including all of apical cells except basal half of outer apical cell, and including inner anteapical cell also. Male pygofer in lateral view with posterodorsal margin narrowly rounded (type) or angulate, posteroventral margin slightly concave, with a group of macrosetae located on dorsal portion of posterior half, with a posteroventral group of microsetae which may be very elongate (holotype) or not; plates not extending posteriorly as far as pygofer apex, with uniseriate macrosetae and with a number of elongate microsetae; style not extending as far posteriorly as midlength of stem of connective; connective T-shaped; aedeagal shaft short, without processes, curved ventrad; paraphyses consisting of a paired basal portion, with a broad flattened ramus which is abruptly narrowed in its apical third, apex acute. Female unknown. Other structural characters as in generic description.

Color of crown, anterior third of pronotum, and scutellum yellowish green, inscribed with narrow black lines and dots, posterior portion of pronotum and coriaceous portion of forewings sordid darker green, the darker portion of the pronotum obscurely marked with black, the forewings with black longitudinal veins; face sordid yellow with a few black spots located on or slightly beneath transition from crown to face; thoracic pleura and legs dull yellow.

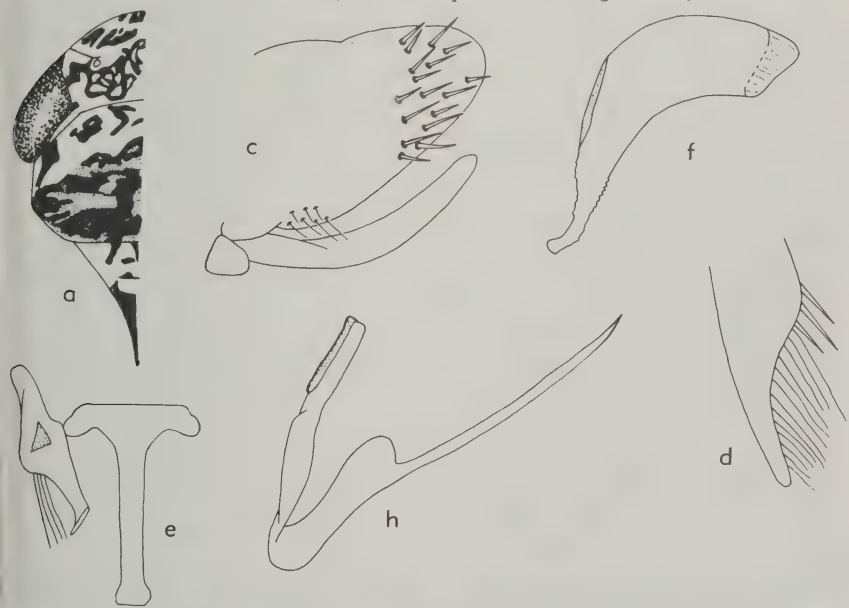


FIGURE 793.—*Hadria viridipennis* (Metcalf and Bruner) (from specimen from Cuba; *h* from lateral view).

Holotype male, at Blanton Mine, north of San Cristóbal, July 26, 1917 (H. Morrison); one male, 8 miles up Macoris River, July 16, 1917 (H. Morrison); one male, Paso Bajito, road to Constanza, April 1-2, 1953 (J. A. Ramos); one male, Valle Nuevo, Prov. La Vega, December 28, 1955, 1500 m. (J. Maldonado Capriles); and one male, San Isidro District, Santo Dominico, December 18, 1955 (J. Maldonado Capriles); all from Dominican Republic (USNM).

H. maldonadoi, n. sp., is closely related to *H. trinitalis* Metcalf and Bruner from which it may be separated by the form of the paraphyses, of which the sclerotized part is narrowed at a more proximal point in *trinitalis*. The new species is named in honor of Dr. Maldonado who has done much to forward our knowledge of the Cicadellidae.

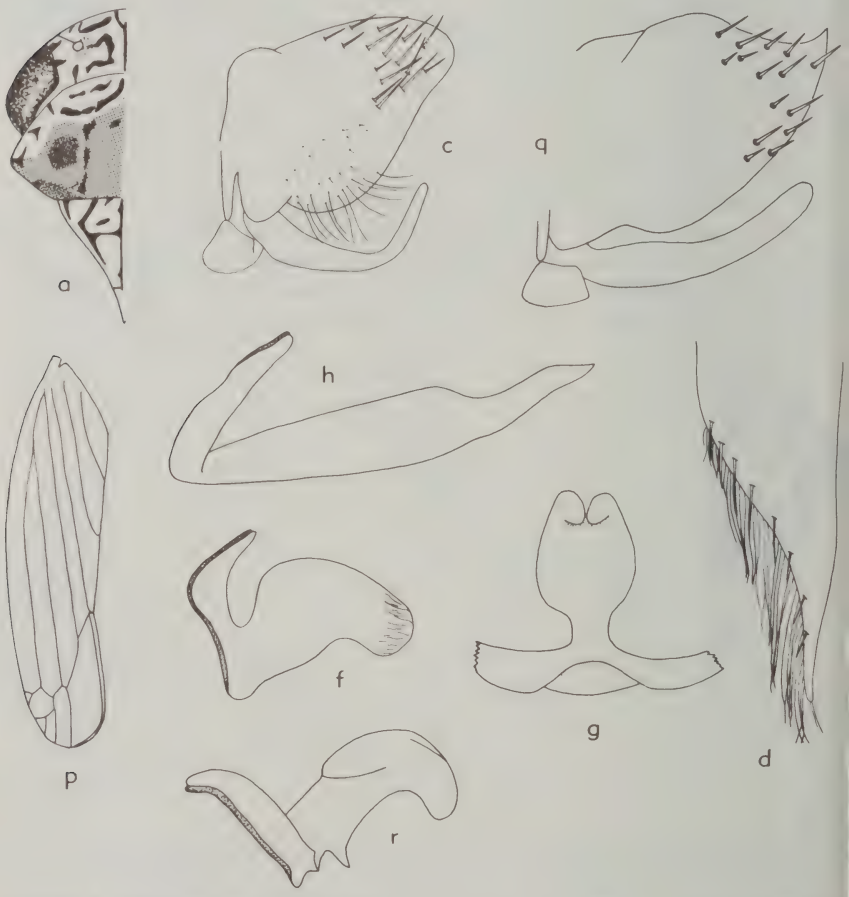


FIGURE 794.—*Hadria maldonadoi*, n. sp. (*g*, *p-r*, from specimen from Dominican Republic; remainder from holotype; *h* from lateral view; microsetae not shown in *q*): *p*, Forewing, *q*, male pygofer and plate, from lateral view; *r*, aedeagus from lateral view.

132. Genus MAREJA Melichar

Figures 795-798

Mareja Melichar, 1926a:343. Type-species: *Tettigonia limbaticollis* Stål (which is a junior subjective synonym of *T. urbana* Stål) by subsequent designation of China, 1938d:184.

Length of male 7.4-10.1 mm, of female 8.0-10.7 mm.

Head strongly produced, its median length varying from slightly less than seven-tenths interocular width to one-fourth greater than interocular width, and from slightly less than four-tenths to seven-tenths transocular width, anterior margin angular or rounded (*M. reticuliceps*, n. sp.) in dorsal view, with or without a carina at transition from crown to face, ocelli located on or behind a line between anterior eye angles, their relative distance from adjacent anterior eye angle and from median line of crown variable interspecifically, disk of crown concave, surface without sculpturing, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, each in lateral view with anterior portion widened, flattened, and anterior margin very convex; clypeus convex or flattened, granulate to smooth medially, muscle impressions not very distinct, face without pubescence, transclypeal suture obsolete medially, clypellus in profile continuing contour of clypeus.

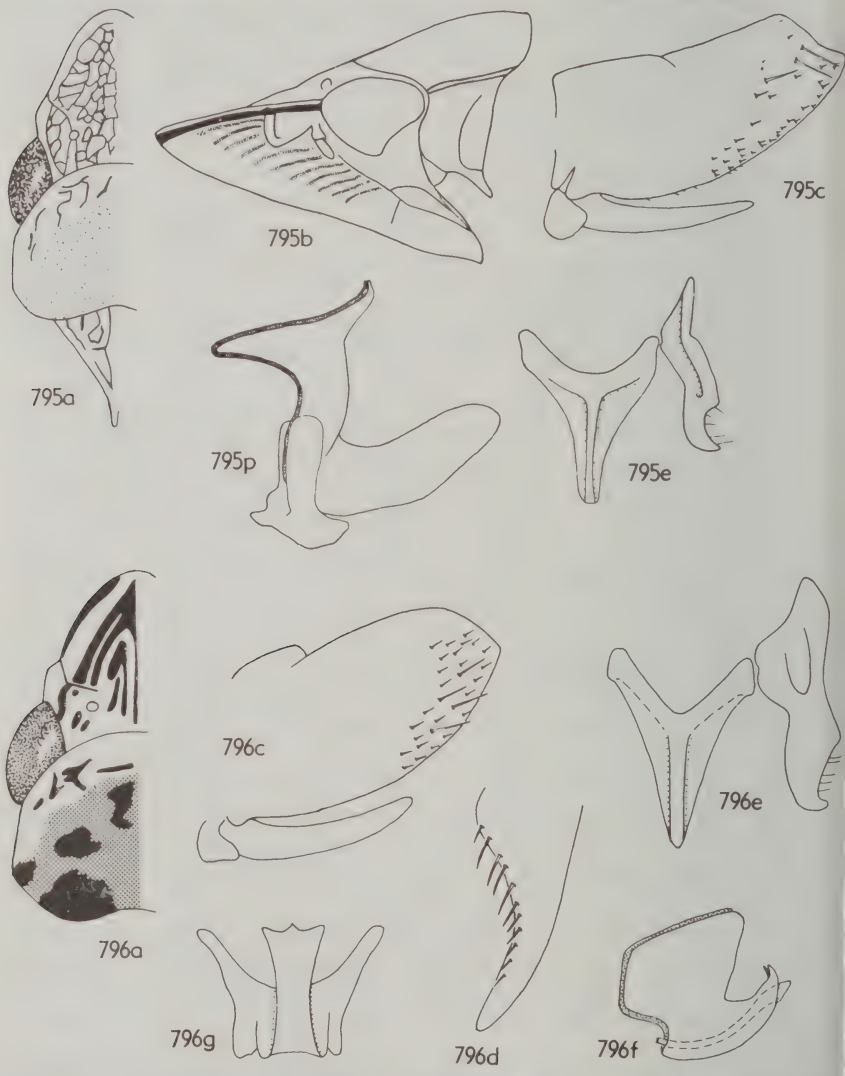
Thorax with pronotal width varying from slightly less to slightly greater than transocular width of head, lateral margins parallel or nearly so, dorsopleural carinae complete, posterior margin concave, disk usually not sculptured (transversely rugulose in *Mareja urbana* (Stål) and some specimens of *M. anceps* (Fowler)), without pubescence; proepimeron partially divided by a curved sulcus (fig. 795b); scutellum not transversely rugulose behind transverse sulcus. Forewing with membrane absent or including all or only a part of inner apical cell, veins usually distinct, with four apical cells and base of fourth located much more proximally than base of third, with three closed anteapical cells, texture coriaceous, without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, posterior margin angulate or truncate, with few to many macrosetae of various sizes on posterior half, without processes. Plates narrowly triangular, not extending posteriorly nearly as far as pygofer apex, with uniseriate macrosetae and with a number of microsetae. Style not extending as far apically as apex of connective, with a slight preapical lobe, apex rounded or acute. Connective Y-shaped with arms widely divergent, not as long as stem. Aedeagus very short and curved strongly dorsally, without processes on shaft. Paraphyses varying from vestigial to paired at base and with a median ramus or with two asymmetrical rami.

Female abdominal sternum VII very long, narrowed abruptly posteriorly and with a median narrowly convex lobe. Dorsal membrane of genital chamber without definite sclerites. Ovipositor with second valvulae each slightly

broadened beyond basal curvature, primary teeth of dorsal margin small, extending almost to acute apex and with minute secondary denticles on the primaries, without anteapical dorsal or anteapical posteroventral denticles. Pygofer slender and elongate, with numerous small macrosetae anteapically and parallel to posteroventral margin.

Specimens of *Mareja* Melichar have been studied from Central America and northern South America. All the species of *Mareja* are inscribed with black on



FIGURES 795, 796.—795, *Mareja reticuliceps*, n. sp., holotype: *p*, Aedeagus and paraphyses, from lateral view. 796, *M. anceps* (Fowler) (*a* from Juan Minas Plantation, Panama; *c-g* from El Valle, Panama).

the crown. *Mareja* species are similar in form to the larger species of *Graphocephala* Van Duzee, but can be separated readily from all other similar genera by the scleritelike lobe of the proepimeron and by the very broad and convex anterior margins of the antennal ledges in lateral view.

I examined the female holotype of *Tettigonia viridescens* Walker. My records warrant nothing more than placing the species in *Mareja*.

My identification of *Tettigonia anceps* Fowler is based on an examination of the male lectotype. The female lectotype of *Tettigonia obtusior* Fowler was studied, and is the basis for the present identification of that species.

I compared the female lectotype of *Tettigonia urbana* Stål with the present illustration of the crown and pronotum (fig. 797*a*). I follow Schröder (1959*a*:499 in placing *T. limbaticollis* Stål in synonymy.

SPECIES OF *MAREJA*

anceps (Fowler), 1900c:279 (*Tettigonia*). Costa Rica, Panama, Colombia, Venezuela.
obtusior (Fowler), 1900c:278 (*Tettigonia*). Panama. New combination.
reticuliceps, n. sp. Costa Rica, Panama.
urbana (Stål), 1864a:74 (*Tettigonia*). S. Mexico, Guatemala, El Salvador, Nicaragua.
limbaticollis (Stål), 1864a:76 (*Tettigonia*).
viridescens (Walker), 1851b:765 (*Tettigonia*). Venezuela. New combination.

KEY TO SPECIES OF *MAREJA*

(*M. viridescens* (Walker) not included)

1. Markings of crown consisting of reticulate black lines
reticuliceps, n. sp.
Markings of crown consisting of black lines which are not reticulate 2

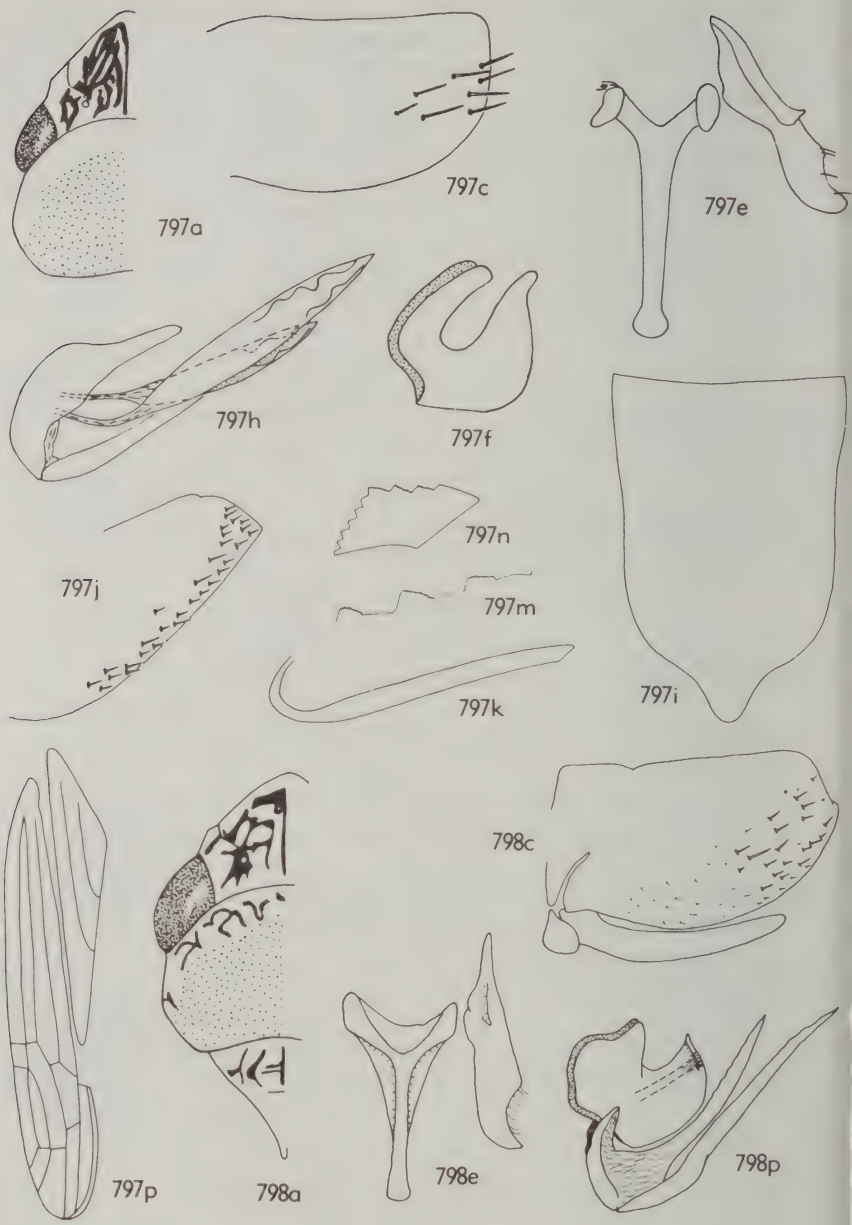
2. Markings of crown distinctly darker and broader anteriorly than on remainder; male genitalia without asymmetrical paraphyses
anceps (Fowler) (fig. 796)
Markings of crown not distinctly darker and broader anteriorly than on remainder; male genitalia with asymmetrical paraphyses 3

3. Head more strongly produced; its length more than three-fourths its transocular width; specimens larger, length 9.1-10.7 mm
urbana (Stål) (fig. 797)
Head less strongly produced; its length less than three-fourths its transocular width; specimens smaller, length 7.4-8.3 mm
obtusior (Fowler) (fig. 798)

Mareja reticuliceps, NEW SPECIES

FIGURE 795, PAGE 978

Length of male 9.0-9.7 mm, of female 8.4-9.2 mm. Head with median length varying from slightly greater to one-fourth greater than interocular width, and from seven-tenths to slightly less than eight-tenths transocular width, anterior margin in dorsal view broadly rounded for the genus, margin



FIGURES 797, 798.—797, *Mareja urbana* (Stål) (*a, c, e, f, h,* from specimen from El Salvador; remainder from Chiapas, Mexico; plate not shown in *c; h* from lateral view): *p,* Forewing (broken). 798, *M. obtusior* (Fowler) (from specimen from Panama): *p,* Aedeagus and paraphyses.

angular at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle; clypeus slightly flattened and slightly granulate medially. Thorax with pronotal width slightly less than transocular width of head; forewing without a membrane. Male with posterior pygofer margin angulate, with numerous short and a few large macrosetae on apical half; paraphyses consisting of a pair of basal arms and a median portion that is located beneath base of aedeagus.

Color of crown, anterior portion of pronotum, and scutellum, yellowish green, crown closely inscribed with black reticulations except margin which is unmarked (pink in the females at hand), anterior portion of pronotum with few narrow longitudinal black markings; scutellum with very narrow black markings delimiting median line and (at least partially) the lateral margins, with additional shorter narrow black linear markings; posterior two-thirds of pronotum and forewings dark green except a broad pale yellow to bright orange stripe along costal margin and curving across apical cells to appendix, a spot in base of inner apical cell and apical margin narrowly, black; face green or greenish yellow, delimited dorsally by a black line in males; prothorax with dorsopleural carina bordered ventrally with black; legs and venter of abdomen yellow to yellowish brown.

Holotype and one additional male, Mojinga Swamp, Panama Canal Zone, December 10, 1951 (F. S. Blanton) and two females, San Carlos and Turrialba, Costa Rica (Schild and Burgdorf) (USNM).

The reticulate markings of the crown will readily separate *M. reticuliceps*, n. sp., from other species, as will the distinctive aedeagus and paraphyses.

133. GRAPHOGONALIA, NEW GENUS

FIGURES 799-811

Type-species; *Graphogonalia evagorata,* new species.

Length 5.0-7.3 mm.

Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from two-thirds to approximately eight-tenths interocular width and from four-tenths to slightly more than one-half transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, crown usually with a shallow concavity near middle of disk, without a median fovea; surface of crown without sculpturing or setae; lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges in lateral view with anterior margins oblique and either rectilinear or slightly convex; clypeus convex medially, muscle impressions usually not very distinct, often with a narrow vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, transclypeal suture interrupted medially, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width equal to or less than transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete,

posterior margin concave, disk of pronotum usually without sculpturing (at most weakly transversely rugulose), not pubescent; scutellum usually not transversely striate behind transverse sulcus. Forewing with only inner portion of inner apical cell membranous, veins not elevated, but paler and distinct from remainder of wing surface, with three closed anteapical cells of which the bases are proximal to a transverse line through the claval apex, usually

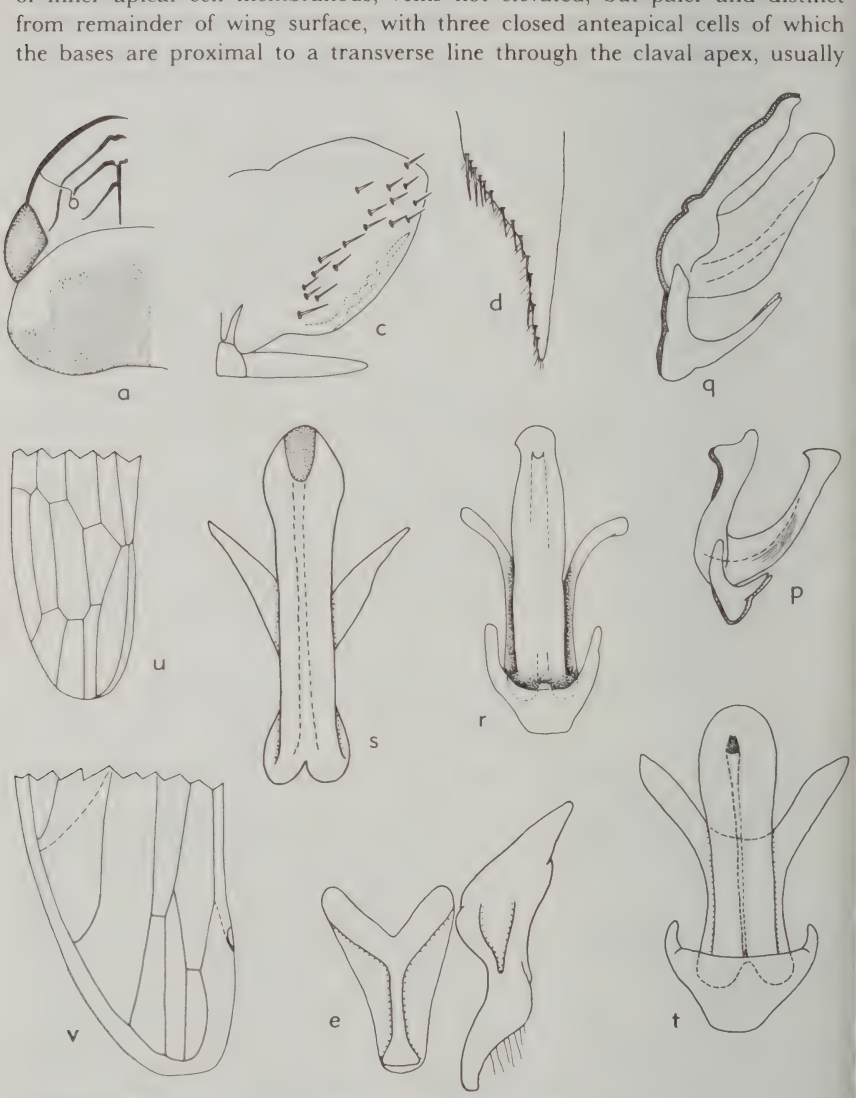


FIGURE 799.—*Graphogonalia evagorata*, n. sp. (see also fig. 800) (*a*, *d*, *e*, *p*, from typical specimen from Mérida, Mexico; *q*, from Sinaloa, Mexico; *c*, *r*, from Quezaltepeque, El Salvador; *s*, *t*, from specimens from Mexico; *u*, *v*, from Puntarema, Costa Rica): *p*, *q*. Aedeagus and paraphyses, from lateral view; *r*, *t*, the same, from caudoventral view; *s*, aedeagus from caudoventral view; *u*, *v*, fore- and hindwing apex, respectively.

without any supernumerary crossveins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere slightly greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, apex usually strongly convex posterodorsally, slightly convex or concave on posteroventral margin, with a number of multiseriate macrosetae parallel to posteroventral margin; pygofer with one or two processes varying interspecifically in location. Plates slender, triangular, not extending as far posteriorly as pygofer apex, with uniseriate macrosetae. Style extending posteriorly approximately as far as apex of connective, acute or truncate apically, with lobe near midlength of shank. Aedeagus variable interspecifically, from short to long and slender, with or

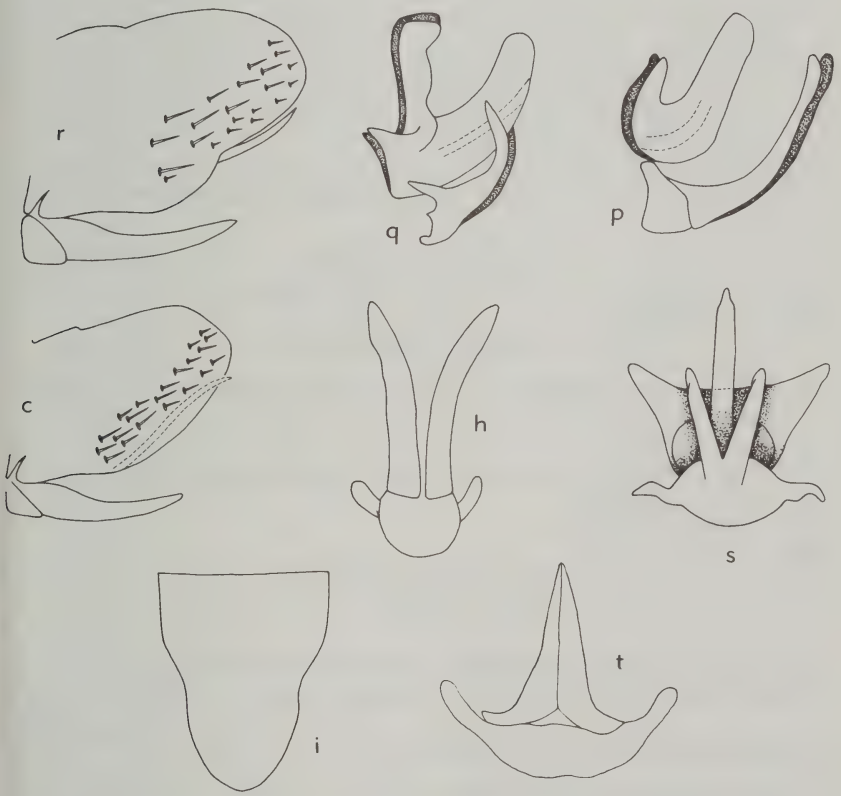


FIGURE 800.—*Graphogonalia evagorata*, n. sp. (see also fig. 799) (*c*, *h*, *i*, *p*, from specimens from Vergel, Chiapas, Mexico; *t* from Sinaloa, Mexico; remainder from Santa Engracia, Mexico; *h* from caudoventral view): *p*, *q*, Aedeagus and paraphyses, from lateral view; *r*, male pygofer and plate, from lateral view; *s*, aedeagus and paraphyses, from caudoventral view; *t*, paraphyses from caudoventral view.

without apical processes. Paraphyses present and varying from short, plate-like, and without rami, to biramous with arms long and slender, or with a single asymmetrical ramus, or absent.

Female abdominal sternum VII produced and angulate or narrowly rounded at apex. Ovipositor with toothed portion of second valvula extending full length of dorsal margin beyond basal curvature, the teeth widely spaced near base, close-set near apex, secondary denticles minute or absent (at × 160), apex acute, with or without anteapical denticles. Pygofer moderately produced and acute apically, with a number of multiseriate macrosetae parallel to posteroventral margin.

All of the species of *Graphogonalia* have black markings on the crown. These are usually linear (occurring as spots in some specimens of *G. anduzei*, n. sp.). The shape of the head is similar to species of *Graphocephala* of the *sasaima* group.

Graphogonalia occurs from northern to southern Mexico, Guatemala, Honduras, El Salvador, Costa Rica, Tobago Island, and Venezuela. The genus is close to the new genera *Coronigonalia* and *Crossogonalia* (below) from both of which it may be separated most readily by the markings of the crown (see above). Some species of *Graphocephala* have similar markings (*sasaima*, n. sp.; *redacta* (Fowler)), but these species have paired asymmetrical paraphyses.

I have studied the lectotype of *Tettigonia orbata* Fowler (fig. 805).

SPECIES OF *GRAPHOGONALIA*

anduzei, n. sp. El Salvador, Panama, Venezuela, Tobago Island.
celeta, n. sp. S. Mexico.
clypealis, n. sp. Guatemala, Br. Honduras, Honduras.
concava, n. sp. Guatemala.
evagorata, n. sp. N. to S. Mexico, Br. Honduras, Honduras, El Salvador, Costa Rica, Panama.
obversa, n. sp. Mexico.
orbata (Fowler), 1900d:286 (*Tettigonia*). S. Mexico. New combination.
reversa, n. sp. Br. Honduras.
reversula, n. sp. Br. Honduras.
spangleri, n. sp. S. Mexico.
vicina, n. sp. S. Mexico, Guatemala, El Salvador, Venezuela.
vulgaris, n. sp. N. and centr. Mexico, Panama.

KEY TO MALES OF *GRAPHOGONALIA*

1. Pygofer with a deep concavity at apex (fig. 801*c*) ..... *concava*, n. sp., page 985
   Pygofer not strongly concave at apex 2
2. Pygofer with posteroventral process only 3
   Pygofer with additional process or without posteroventral process 6
3. Aedeagus very long and slender, not narrowed anteapically nor broadened apically in caudoventral view ..... *anduzei*, n. sp., page 986
   Aedeagus shorter and broader, or narrowed anteapically, and/or broadened apically if long and slender 4

4. Aedeagus long and slender, distinctly narrowed anteapically, apex broadened, often into distinct processes ..... *vicina*, n. sp., page 988
Aedeagus shorter and broader 5

5. Aedeagus narrowed in basal half in caudoventral view, gradually broadened in apical half almost to apex ..... *celeta*, n. sp. page 988
Aedeagus variable (figs. 797*r-t*), but not as above
evagorata, n. sp., page 990

6. Aedeagus in lateral view with a strong convexity on ventral margin at midlength ..... *orbata* (Fowler) (fig. 805)
Aedeagus without such a convexity 7

7. Pygofer with a process arising dorsoapically and extending anteriorly or anteromesally, paraphyses unpaired except at base 8
Pygofer with dorsal process arising near base and extending posteriorly; paraphyses absent or with paired rami 10

8. Pygofer with a lobate protuberance at apex of pygofer process, apex narrowly rounded dorsoapically (fig. 808*c*) 9
Pygofer without such a protuberance, apex very broadly rounded
obversa, n. sp., page 991

9. Aedeagal shaft very strongly convex at base (fig. 807)
reversula, n. sp., page 993
Aedeagal shaft not so (fig. 808*f*) ..... *reversa*, n. sp., page 991

10. Paraphyses symmetrical; aedeagus with a pair of slender lanceolate processes appressed to shaft ..... *vulgaris*, n. sp., page 993
Paraphyses absent; aedeagus without processes 11

11. Pygofer with an apicoventral process extending anteromesally and crossing its complement; aedeagus with a thin vertical platelike apodeme at base ..... *clypealis*, n. sp., page 994
Pygofer with only a dorsal process; aedeagus without such an apodeme
spangleri, n. sp., page 996

Graphogonalia concava, NEW SPECIES

FIGURE 801, PAGE 986

Length of male 7.2 mm. Head with median length of crown slightly more than seven-tenths interocular width and less than one-half transocular width. Male pygofer in lateral view with a deep concavity at apex, with a process arising on dorsal margin at base of dorsoapical pygofer lobe, broadening and extending mesad almost to median line; aedeagus very short, with a corona of minute denticles near apex of shaft; paraphysis bilobed at base, with a single ramus that is not located in median plane.

Crown with an anterior marginal ivory border extending from eye to eye, remainder olive-yellow with a number of narrow black lines; anterior portion of pronotum concolorous with crown, obscurely and sparsely marked with black, lateral pronotal margins ivory, disk dark green; scutellum concolorous

with crown, heavily inscribed with black lines; forewing dark green, costal margin with narrow orange border continuing through apical cells, apical margin black.

Holotype male, Cayuga, Guatemala, May 1915 (William Schaus) (USNM).

The form of the pygofer apex will separate *G. concava* readily from other species of *Graphogonalia*.

Graphogonalia anduzei, NEW SPECIES

FIGURE 802, PAGE 987

Length of male 5.0-5.7 mm, of female 5.6-6.3 mm. Head with median length of crown varying from seven-tenths to slightly more than three-fourths interocular width and from slightly less than one-half to slightly more than one-half transocular width. Male with aedeagus elongate, slender, not narrowed anteapically and usually not broadened at apex, apical margin varying from very shallowly (fig. 802*g*) to more deeply concave; paraphyses consisting of a transverse arcuate plate across and below base of aedeagal shaft, without rami.

Crown, anterior portion of pronotum, and all of scutellum, olive; crown variously marked with median black spots or slender black arcs more or less parallel to anterolateral margins, or a combination of median spots and arcuate lines; remainder of pronotum and forewings darker green with apical margins of latter black; face, venter, and legs stramineous, with a black line bordering dorsopleural carina beneath, and a small black area at base of costal margin of forewings.

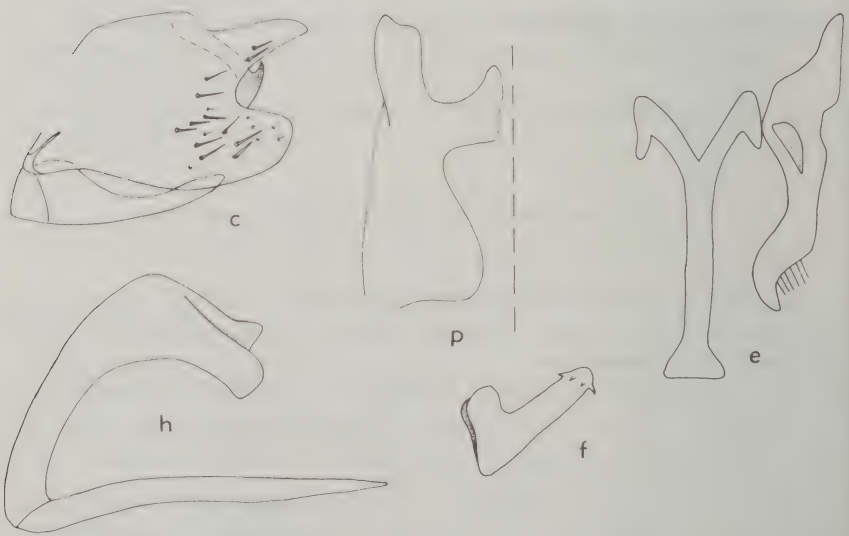


FIGURE 801.—*Graphogonalia concava*, n. sp., holotype (*h* from lateral view): *p*, Male pygofer apex, left side, from caudal view.

Holotype male, "El Maria", Panama, July 14, 1953 (F. S. Blanton); one male, Ancón, Panama, November 11, 1952 (F. S. Blanton); two males, Taboga Island, Panama, September 21, 22, 1918 (H. F. Dietz); one male and one female, Taboga Island, Panama, June, 1953 (N. L. H. Krauss) on *Lantana camara* L.; one male, Penonomé, Panama, November 23, 1952 (F. S. Blanton); two males and one female, Tobago Island, W. I., July 17-19, 1964 (J. Maldonado-Capriles); one male and one female, Las Trincheras, Venezuela, April 16, 1939 (C. H. Ballou); six males and seven females, San Estebán, Venezuela, November 22-30, 1939 (Pablo Anduze); thirteen males and ten females, Roxborough, Tobago Island, W. I., November 6, 1918 (Harold Morrison); one female, same locality but different site and November 7, 1918 (Harold Morrison) (USNM). Two males and two females, Panama City, Canal Zone, March 2, 1921 (J. G. Sanders), (DeLong collection, OSU). One female and one specimen without abdomen, Guanare, Portuguesa, Venezuela, October 10-13, 1957 (Borys Malkin) (CAS).

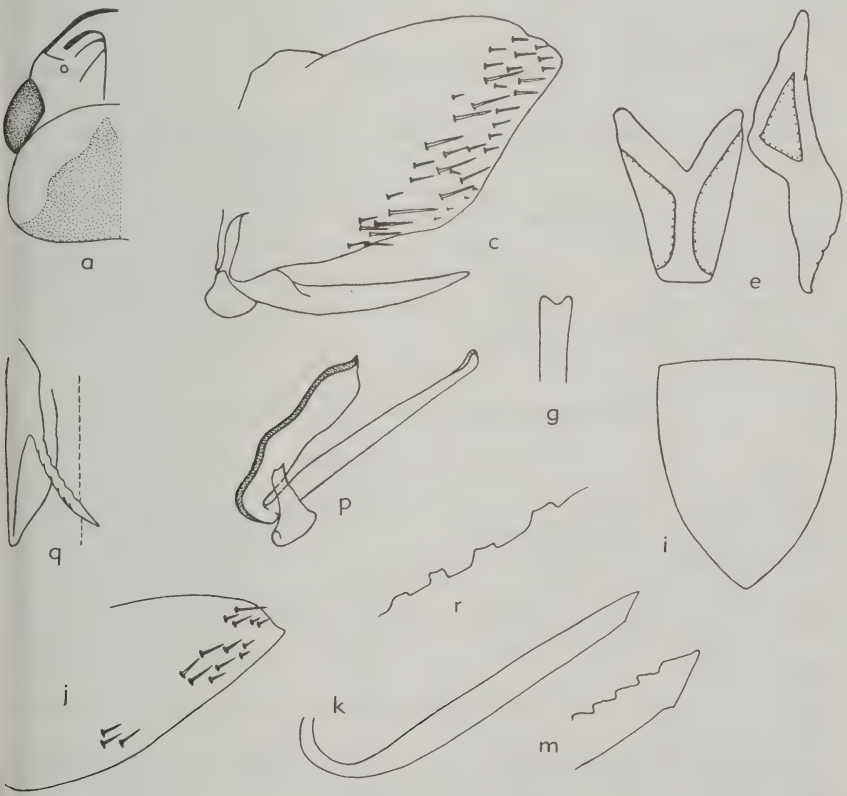


FIGURE 802.—*Graphogonalia anduzei*, n. sp. (*i-k, m, r*, from specimen from San Estebán, Venezuela; remainder from Panama; only apex of aedeagus shown in *g*): *p*, Aedeagus and paraphyses, from lateral view; *q*, apex of male pygofer, right side, from ventral view; *r*, basalmost teeth of second valvula.

G. anduzei, n. sp., is named in honor of Dr. Pablo Anduze who collected one series of specimens of the species. *G. anduzei* is very similar to *G. vicina*, n. sp., but differs in that the shaft of the aedeagus is of nearly uniform width throughout, and in that the aedeagal apex is seldom broadened, and then not as much so as in *vicina*.

Graphogonalia vicina, NEW SPECIES

FIGURE 803, PAGE 989

Length of male 5.4-6.2 mm, of female 5.6-5.9 mm. Head with median length of crown varying from slightly less than two-thirds to slightly less than eight-tenths interocular width and from four-tenths to one-half transocular width. Male with aedeagus elongate, slender, shaft narrowed anteapically and broadened apically, shaft arched slightly posteriorly in lateral view, apex with a very short curved process on each side in caudoventral view, and with apical margin slightly concave between the processes; paraphyses as in *G. anduzei*, n. sp. (above).

Color as in *anduzei*, but with black markings of crown not occurring as spots.

Holotype male and two females, "Puerto Madiera", Chiapas, Mexico, October, 1954 (N. L. H. Krauss), on leaves of *Lantana camara* L.; one male, Tapachula, Chiapas, Mexico, May 7, 1944 (E. Hernandez); two males, 1 mile N. of Finca la Maquina, Dept. "Suchitepequez", June 11, 1966 (O. S. Flint); one male, Santa Anna, El Salvador, October, 1959 (N. L. H. Krauss) (USNM). One male, Chapingo, D. F., Mexico (DeLong collection, OSU).

G. vicina, n. sp., is very similar to *G. anduzei* in the discussion of which distinguishing characters are treated.

Graphogonalia celeta, NEW SPECIES

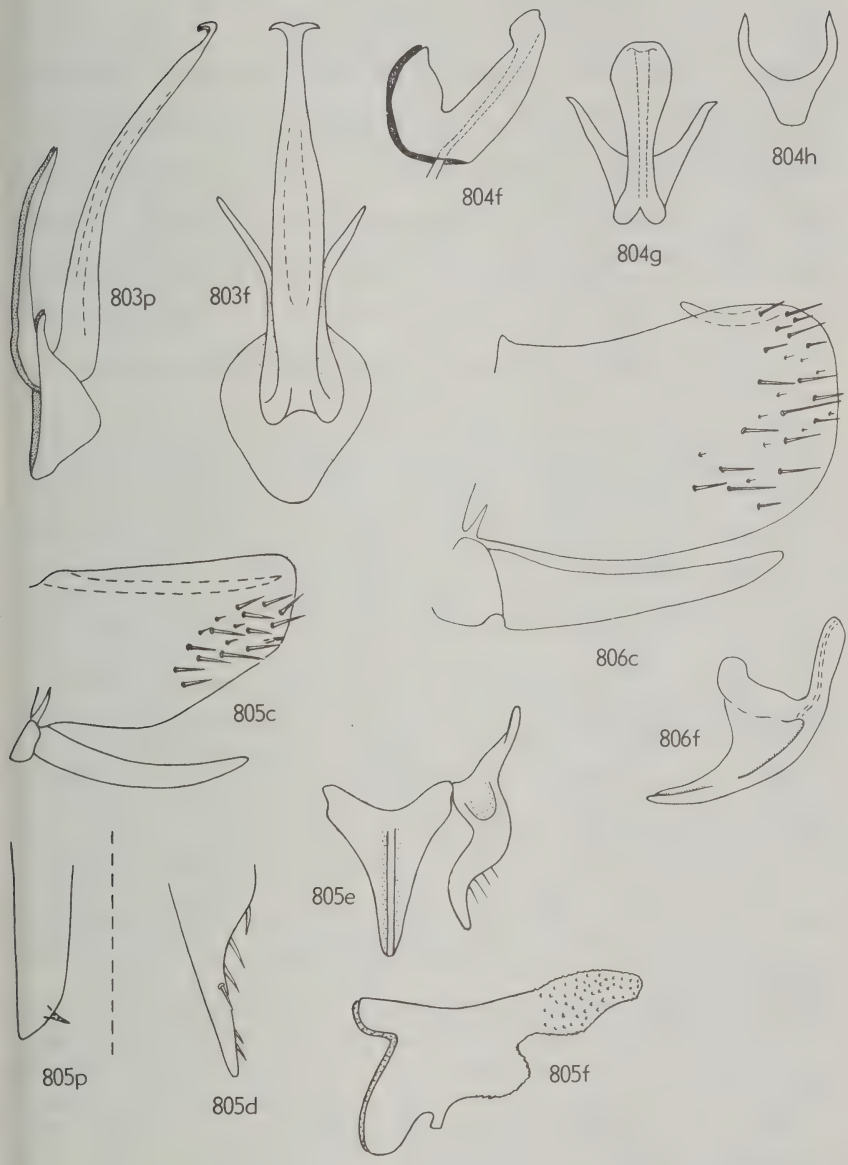
FIGURE 804, PAGE 989

Length of male 5.9-6.1 mm. Head with median length of crown varying from two-thirds to three-fourths interocular width and slightly more than one-half transocular width. Male with aedeagus very short in comparison to *G. anduzei*, n. sp., and *G. vicina*, n. sp., in caudoventral view with shaft gradually broadened in its apical one-half, apical margin convex; paraphyses consisting of a very short base and a pair of short, slender, tapering, acute, widely-separated rami.

Color as in *anduzei* except that the dark markings of the crown occur as fine lines, not as spots.

Holotype and one additional male, Tuxtla Gutiérrez, Mexico, "M. F. 1055", July 29, 1936 (DeLong collection, OSU).

G. celeta, n. sp., is closer to *G. evagorata*, n. sp. (below) that to the other species of the genus, but the form of the aedeagus is distinctive for *celeta*.



FIGURES 803-806.—803, *Graphogonalia vicina*, n. sp., holotype: *f*, Aedeagus and paraphyses, from caudoventral view; *p*, aedeagus and paraphyses, from lateral view. 804, *G. celeta*, n. sp., holotype (*h* from caudal view). 805, *G. orbata* (Fowler), lectotype: *p*, Male pygofer apex, apical portion, from ventral view. 806, *G. obversa*, n. sp., holotype.

Graphogonalia evagorata, NEW SPECIES

FIGURES 799, 800, PAGES 982, 983

Length of male 5.2-6.1 mm, of female 5.8-6.3 mm. Head with median length of crown varying from two-thirds to slightly less than eight-tenths interocular width and from four-tenths to slightly more than one-half transocular width. Male with aedeagus variable, from short and more or less digitate and rounded apically, to more elongate and truncate apically in lateral view, in ventral view with shaft varying from very narrow to broader than in other species of the genus, apical margin convex; paraphyses varying from a transverse arcuate plate across and below base of aedeagal shaft and without rami to biramous with rami extending from such a basal piece as far posteriorly as the aedeagal apex.

Color as in *G. anduzei*, n. sp., above, except that black markings of crown are always linear and large spots do not occur.

Holotype male, Mérida, Yucatan, Mexico, July 29-30, 1964 (Paul J. Spangler); two males intercepted at New Orleans from Mérida, Yucatan, October 8 and October 10, 1945; one female, Uxmal, Yucatan, Mexico, October, 1950 (N. L. H. Krauss); one female, Yaxcopoil, Yucatan, Mexico, October, 1950 (N. L. H. Krauss); one male, San Miguel, Cozumel Island, Quintana Roo, Mexico, July 1, 1959 (N. L. H. Krauss); seven males and three females, same data as preceding except without date of month; one male, Mexico "1785"; one male, Acapulco, Mexico, July 30 (Fred Knab); one male, "Piattla" [Piaxtla?], Sinaloa, Mexico, August, 1954 (R. E. Ryckman, C. E. Christianson, D. Spencer); one male and one female, Morazán, Honduras, December 2, 1965 (N. L. H. Krauss); one male, 5 miles West of Jícaro Galan Jct., Honduras, July 9, 1965 (Paul J. Spangler); two males, El Salvador, San Salvador, June 9, 1958 (L. J. Bottimer); one male and one female, Tonacatapeque, El Salvador, June 20, 1958 (L. J. Bottimer); one male, El Salvador, San Salvador, June 26, 1958 (L. J. Bottimer); one female, La Palma, El Salvador, June 24, 1958 (L. J. Bottimer); one female, El Salvador, San Salvador, October, 1959 (N. L. H. Krauss); one female, same data, except 1965; one male, Puntarenas, Costa Rica, November 9, 1905 (Fred Knab); and one male, "Potesa", Panama, September 11, 1952 (F. S. Blanton) (USNM).

One female, May 19; one male, May 21; three males and one female, May 22; one male and one female, May 23; one specimen without abdomen, May 28; one female, May 30; one female, June 4 and one male, June 5, all from Vergel, Chiapas, Mexico, 1935; one male, Acapulco Rd., Mexico, November 22, 1938 (J. S. Caldwell); two males, Peto, Yucatan, Mexico, August 9, 1925; one male and one female, Santa Engracia, Mexico, November 11, 1938 (J. S. Caldwell); three males, El Bañito, Valles, S. L. P., Mexico, June 28, 1940; one male, Ruiz, Nayarit, Mexico, February 23, 1935; one male, Tehuantepec, Oaxaca, Mexico, October 13, 1941 (DeLong, Good, Caldwell, Plummer) (DeLong collection, OSU).

Three males and one female, "Mexico" (White) (NCS).

Two males and two females, Alamos, Sonora, Mexico, August 12, 1960 (P. H. Arnaud, Jr., E. S. Ross, D. C. Rentz); one male, Copala, Sinaloa, Mexico,

August 15, 1960 (same collectors); one male, 13 miles North of Elota, Sinaloa, Mexico, August 14, 1960 (same collectors); one male, crest of first ridge West of Antiguo Morelos, T.[laxcala?], Mexico, (H. B. Leech); two males, Quezaltepeque, 500 M., June 19, 1968 (D. Q. Caragnaro, M. E. Irvin) (CAS).

G. evagorata, n. sp., is more variable than other segregates in the genus, the variations in the form of the aedeagus and male paraphyses (see illustrations) being greater than the specific differences between *G. anduzei,* n. sp. and *G. vicina,* n. sp. but with a sufficient number of intergradations to justify including all of the variations in a single species. The holotype is like the specimen illustrated from Mérida, Yucatan. *G. evagorata* may be separated from other species in the genus by the characters used in the key.

Graphogonalia reversa, NEW SPECIES

FIGURE 808, PAGE 992

Length of male 5.3 mm, of female 6.0 mm. Head with median length of crown approximately seven-tenths interocular width and slightly less than one-half transocular width. Male pygofer with a curved single process arising posterodorsally at apex, extending anteromesad, with a dorsal pygofer lobe opposite apex of process in lateral view (fig. 808*c*); aedeagus with shaft tapered and subacute apically, finely serrulate; paraphyses bilobed at base, with a single ramus that is not located in median plane.

Crown, anterior portion of pronotum and all of scutellum olive, crown with a broad black submarginal line and a number of narrower linear markings more posteriorly, scutellum with longitudinal arcuate black markings extending almost full-length and a short oblique black line on each side of these and touching basal margin; remainder of pronotum and forewings darker green except subcostal, costal, and anteapical portions of forewings which are olive, and dark costal apical margins of latter; face pale with a transverse basal line and median line on clypellus, black; propleura with black markings; legs pale.

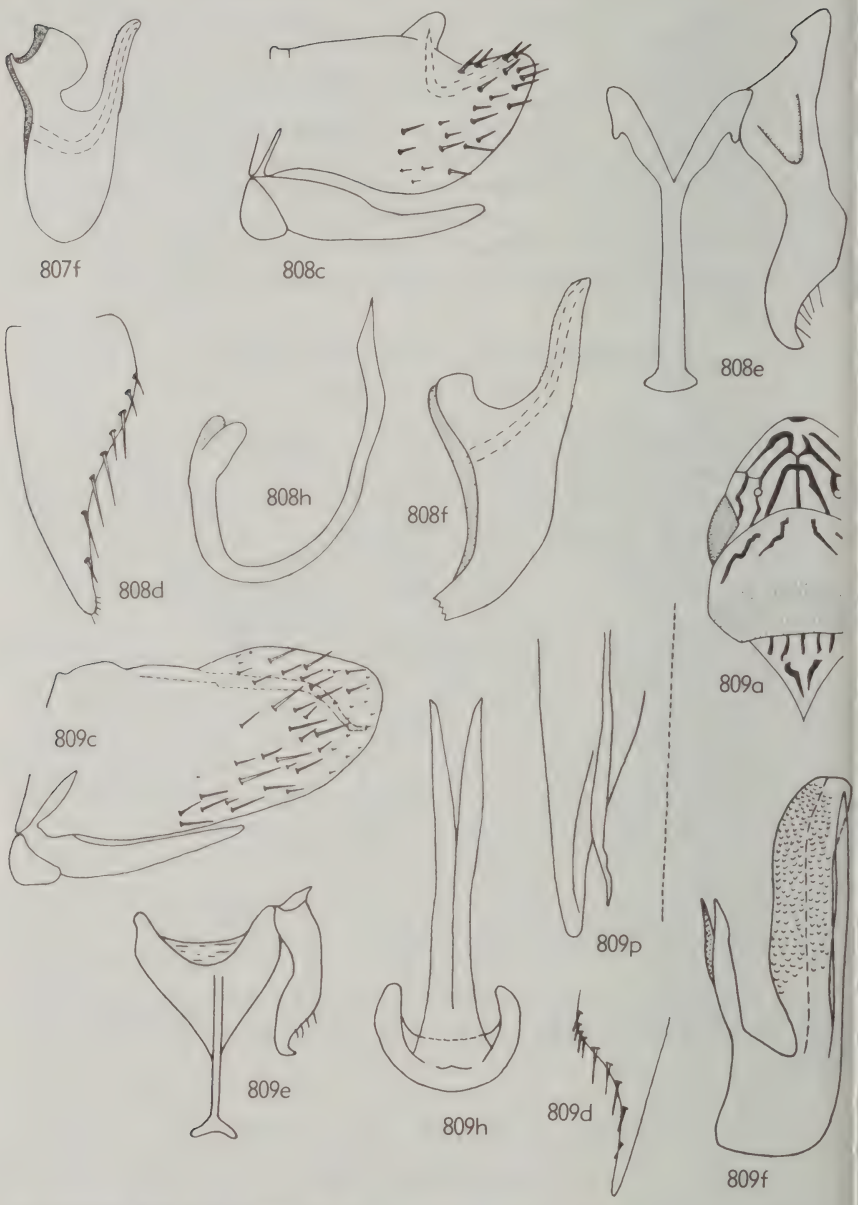
Holotype male and one female, Columbia, British Honduras, April, 1932 (J. J. White) (NCS). Holotype on indefinite loan to USNM.

G. reversa, n. sp., and the following two species are different from other species in the genus in that the pygofer process has a dorsoapical origin, and from all other species except *concava,* n. sp., in the asymmetry of the paraphyses.

Graphogonalia obversa, NEW SPECIES

FIGURE 806, PAGE 989

Length of male 5.9 mm, of female 6.4 mm. Head with median length of crown from two-thirds to three-fourths interocular width and from slightly less than one-half to slightly more than one-half transocular width. Male genitalia as in *G. reversa,* n. sp., except the pygofer apex which is subtruncate.



FIGURES 807-809.—807, *Graphogonalia reversula*, n. sp., holotype. 808, *G. reversa*, n. sp., holotype (*h* from lateral view). 809, *G. vulgaris*, n. sp., (*a*, *e*, *f*, from specimen from Acapulco, Mexico; *h* from Panama; remainder from Mexico; *h* from caudoventral view): *p*, Male pygofer apex, left side, from dorsal view.

Crown and pronotum as in *reversa;* scutellum olive-yellow with vermiculate black lines delimiting two pairs of areoles near unmarked median area, and with a small black spot near each basal angle; forewings as in *reversa;* face pale with a narrow median clypeal black line continuing almost to apex of clypellus, clypeal muscle impressions entirely black near dorsal margin of face, partially black below; proepimeron with an incomplete dark line adjoining dorsopleural carina and with ventral margin narrowly black; legs pale.

Holotype male and one female, Mexico (Baker collection in USNM).

G. obversa is most readily separated from *G. reversa,* to which it is closely related, by the almost truncate form of the apical margin of the pygofer of the male, and from *reversula* by the form of the aedeagus.

Graphogonalia reversula, NEW SPECIES

FIGURE 807, PAGE 992

Length of male 5.9-6.0 mm, of female 6.0-6.4 mm. Head with median length of crown from slightly more than seven-tenths to slightly more than three-fourths interocular width and from slightly less than one-half to slightly more than one-half transocular width. Male pygofer with posterodorsal margin narrowly rounded, with a dorsoapical process extending anteriorly, as in *G. reversa,* n. sp.; other genital characters as in *reversa,* except aedeagus which has a pair of lobes on the dorsal apodemes, and is very strongly convex basiventrally. Color much as in *reversa.*

Holotype and one additional male and one female, La Ceiba, Honduras, September 24, 1916 (F. J. Dyer); one female, La Ceiba, October 24, 1916 (USNM).

Graphogonalia vulgaris, NEW SPECIES

FIGURE 809, PAGE 992

Length of male 4.8-5.1 mm, of female 5.5-5.7 mm. Head with median length of crown varying from approximately seven-tenths to more than eight-tenths interocular width and from slightly less than one-half to six-tenths transocular width. Male pygofer with a process arising basidorsally and extending posteriorly, slightly decurved before apex; aedeagus with shaft of uniform width through most of its length, surface with scalelike sculpturing, aedeagal processes slender, paired, lanceolate, symmetrical, arising at base of shaft and appressed to it; paraphyses with paired elongate slender symmetrical rami.

Crown, pronotum and scutellum olive, the pronotum variably suffused with green in some specimens; crown with an apical black spot and marked with narrow black lines in a double band parallel to anterolateral margins but joined together before attaining middle leaving a median postapical pale areole, and with a black trident on posterior half of crown; pronotum with inconstant narrow black markings near anterior margin; scutellum with four longitudinal narrow dark lines on anterior portion and two such lines on

posterior portion; forewings pale green with apical margin narrowly dark; face, propleura, and legs yellow.

Holotype male, 8 miles North of Volcán, Panama, December 6, 1952 (F. S. Blanton); one female, "Potesa", Panama, September 11, 1952 (F. S. Blanton): one male, Acapulco, Guerrero, December, 1963 (N. L. H. Krauss); one male and one female, Barra de Navidad, Jalisco, Mexico, September, 1965 (N. L. H. Krauss); one male and one female, East of Mazatlán, Sinaloa, Mexico, August 15, 1954 (Ryckman, Christianson and Spencer) (USNM). Three males, seventeen females, three specimens without abdomens, Acapulco, Guerrero, Mexico, September 10, 1939 (DeLong and Plummer); one male, Mezcala, Guerrero, Mexico, October 22, 1941, K 247 (DeLong, Good, Caldwell and Plummer); one male, Huetamo, Michoacán, Mexico, August 22, 1933, M. F. 3100 (no collector) (DeLong collection, OSU). One male, 6 miles North of Aculco, Mexico, Mexico, August 18, 1954 (J. G. Chillcott) (CNC). Two males and three females, 39 miles N.W. of San Ignacio, Baja California, Dist. Sur. Mexico, November 3, 1965 (W. Ewart, R. Dickson), "Encelia sq."; one male, 20 miles W. of Rosario, Sinaloa, Mexico, January 30, 1964 (E. Schlinger, M. E. Irwin and P. M. Estes) (University of California at Riverside).

G. vulgaris, n. sp., is close to *G. clypealis,* n. sp. (see below), in external appearance, but differs in lacking a black median clypeal area. It also differs from *clypealis* in the presence of paraphyses and aedeagal processes, both of which are lacking in *clypealis*.

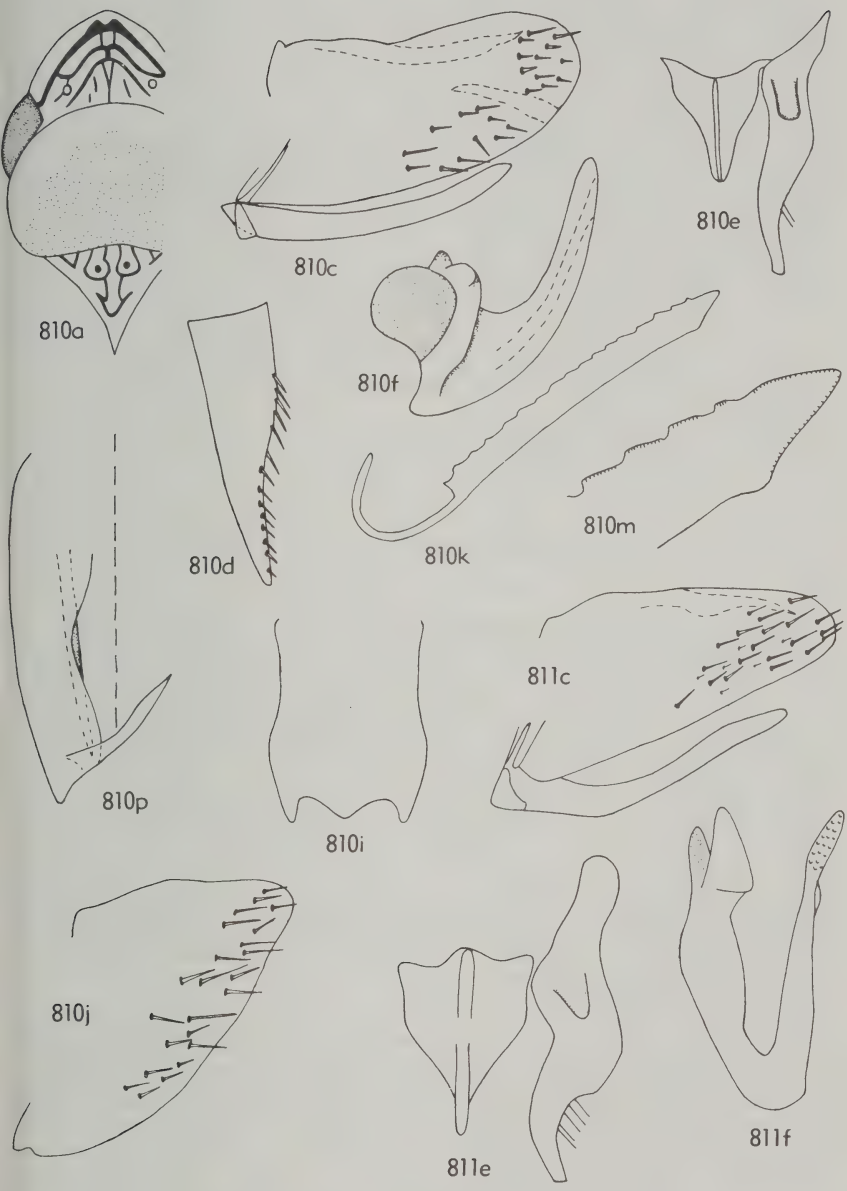
Graphogonalia clypealis, NEW SPECIES

FIGURE 810, PAGE 995

Length of male 6.9-7.3 mm, of female 6.8-7.0 mm. Head with median length of crown varying from more than six-tenths to slightly more than three-fourths interocular width and from slightly less than one-half to slightly greater than one-half transocular width. Male pygofer with a slender acute process arising basidorsally and extending posteriorly, and a second process arising posteroventrally and extending anteromesally and crossing its complement on the median line; aedeagus with a median basal subcircular flat apodeme, shaft slender, tapering, curved gradually posterodorsally and rounded at apex; paraphyses absent.

Crown except greenish-ivory anterior border, anterior portion of pronotum, and scutellum, olive, remainder of pronotum green; crown with narrow black lines mostly parallel to anterolateral margin of head and delimiting one or two slender median areoles; scutellum with black lines delimiting paired basal eyelike circles with black centers and a noselike areole behind them; forewings green with costal margins narrowly bluish, with an anteapical orange band which is bordered with black basally and apically; face with a broad black median area tapered gradually over clypeus and clypellus; thoracic pleura marked with black; legs ferruginous.

Holotype and three additional males, September, 1928 and one female, October, 1928, Morales, Guatemala (J. J. White); three females, Columbia,



FIGURES 810, 811.—810, *Graphogonalia clypealis,* n. sp. (*a, c-f, p,* from holotype; remainder from topotype): *p,* Male pygofer, right side, from ventral view. 811, *G. spangleri,* n. sp., holotype.

British Honduras, April, 1932 (J. J. White); one male and one female, Rio Grande, British Honduras, June 1932 (J. J. White) (NCS). Nineteen specimens, La Ceiba, Honduras (F. J. Dyer): December 28, 1915, one female; December, 1915, two males and one female; January 9, 1916, one male and one female; February 29, 1916, one female; February, 1916, two females; March, 1916, one male; August 12, 1916, one male; August 19, 1916, one male and two females; October 13, 1916, one male and one female; December 19, 1916, three females (USNM). One male, Tegucigalpa, Honduras, March 31, 1917 (F. J. Dyer); one male (intercepted at Philadelphia), Honduras, April, 1934; one male (intercepted at Charleston), "Colombia", January 9, 1936; one male (intercepted at New York), "Costa Rica - Canal Zone", October 14, 1935; one male (intercepted in banana cargo at Philadelphia), Guatemala, April 13, 1936; one female (intercepted at Baltimore), Guatemala, February 3, 1936 (USNM). One male, one female, and one specimen without abdomen, Los Amates, Guatemala, February 25, 1906 (OSU). Holotype on indefinite loan to USNM.

G. clypealis, n. sp., is similar to *G. vulgaris*, n. sp., in the discussion of which distinguishing characters are treated (above).

Graphogonalia spangleri, NEW SPECIES

FIGURE 811, PAGE 995

Length of male 6.8 mm, of female 6.9-7.2 mm. Head with median length of crown varying from six-tenths to eight-tenths interocular width and from slightly less than four-tenths to slightly more than one-half transocular width. Male pygofer with a single process arising basidorsally, extending posteriorly; aedeagus with shaft U-shaped and slender, with minute scalelike sculpturing beyond gonopore; paraphyses absent.

Color much as in *G. clypealis*, n. sp., but with black marking on face restricted to a narrow line on lower portion of clypeus and upper part of clypellus.

Holotype male and two females, Villahermosa, Tabasco, Mexico, August 6, 1964 (Paul J. Spangler); one female, Mexico, July 26, 1934, intercepted at Philadelphia; one female, Mexico, August 22, 1935, in banana hold, intercepted at Philadelphia (USNM).

G. spangleri, n. sp., is named for the collector of the holotype, Dr. Paul J. Spangler. The species is very similar externally to *G. clypealis*, n. sp., but may be distinguished by the narrow facial black stripe compared to the broader, more extensive stripe in *clypealis*. The form of the aedeagus and of the pygofer processes (figs. 811*f* and *c*) will serve to separate the males readily.

134. CROSSOGONALIA, NEW GENUS

FIGURE 812

Type-species: *Tettigonia hectica* Signoret (1854a:20).

Length of male 6.4-7.7 mm, of female 6.8-6.9 mm.

Head moderately produced, with anterior margin broadly rounded in dorsal view, median length of crown varying from approximately three-fourths to slightly less than nine-tenths interocular width and from slightly less than one-half to slightly more than one-half transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each ocellus equidistant from adjacent anterior eye angle and median line of crown, crown with a transverse concavity before ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus flattened medially, muscle impressions distinct, transclypeal suture obsolete at middle, clypellus not produced, contour of its lower portion slightly more nearly horizontal than profile of remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, disk without sculpture or pubescence; scutellum not transversely striate behind transverse sulcus. Forewing with membrane including inner and second apical cells and apical portions of third and fourth apical cells, extending proximad for a short distance along costal margin, veins not very distinct, evanescent in area of outer apical and outer anteapical cells, base of inner anteapical cell occurring more distally than bases of outermost two anteapical cells, base of outermost apical cell more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere slightly greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer not strongly produced, emarginate (or at least tending to be bilobed) apically, with macrosetae arranged vertically and submarginally near apex, with a group of microsetae near ventral margin, pygofer processes absent. Plates elongate triangular, extending posteriorly beyond pygofer apex, each with uniseriate macrosetae and a large number of elongate fine microsetae at apex. Style extending posteriorly approximately as far as apex of connective, truncate apically, preapical lobe weak. Aedeagus with dorsal apodemes elongate, shaft short, slender, without processes. Paraphyses symmetrical, with stalk short, rami elongate, bisinuate, the apical portion extending dorsad, tapered, and acute, with a short median basal ramus between the longer rami.

Female abdominal sternum VII moderately produced, gradually narrowed to a short convex median lobe. Genital chamber without sclerites. Ovipositor with second valvulae each broadened beyond basal curvature, with sloping quadrate well spaced teeth throughout length and with anteapical dorsal denticles, apex acute. Pygofer obtusangular at apex, with sparse macrosetae parallel to posteroventral margin and anteapically.

Crossogonalia hectica (Signoret), the only species in the genus, occurs in southeastern Brazil. A short series, in USNM, was collected on leaves of *Schinus terebinthifolius* Raddi by N.L.H. Krauss. Specimens of *Crossogonalia hectica* (Signoret) are similar in color, form, and size to species of *Caldwelliola*,

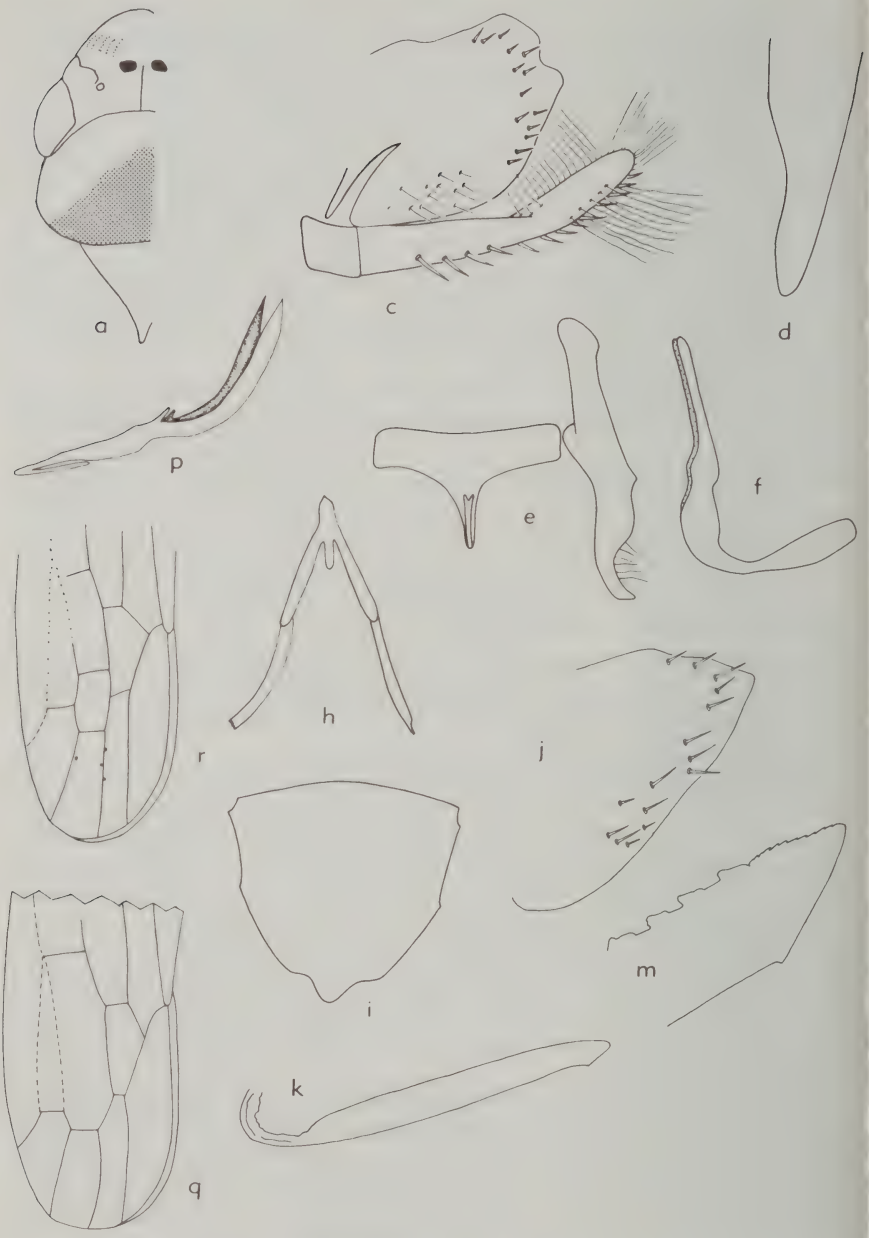


FIGURE 812.—*Crossogonalia hectica* (Signoret) (*c-f, h,* from specimen from Brazil; *i* from lectotype; *r* from Bahia, Brazil; remainder from Rio de Janeiro, Brazil; *h* from dorsal view; setae not shown in *d*): *p,* Paraphyses from lateral view; *q, r,* apex of forewing.

new genus, and to *Chlorogonalia ultima,* n. sp. They are green with the head, anterior portion of the pronotum, and the scutellum yellow, but the face and often the clypeal muscle impressions visible from a dorsal view, are orange. The females have much sharper apices of the second valvulae than in *Caldwelliola,* and are fairly close to *Graphogonalia,* new genus. The elongate fine setae at the apices of the male plates in *Crossogonalia* will distinguish it, without dissection, from the species of *Chlorogonalia,* new genus and *Caldwelliola* that look similar, and also from *Graphogonalia* species. The short sternal abdominal apodemes and symmetrical paraphyses of the males are also diagnostic for *Crossogonalia.*

My identification of *Crossogonalia hectica* (Signoret) is based on a study of the female lectotype, and a male compared with it.

135. SEGONALIA, NEW GENUS

FIGURE 813

Type-species: *Segonalia steinbachi,* new species.

Length of male 5.2 mm, of female 5.3-5.5 mm.

Head slightly produced, with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than six-tenths to almost two-thirds interocular width and from slightly more than one-third to four-tenths transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each ocellus closer to adjacent anterior eye angle than to median line of crown, crown not or scarcely concave across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus flattened medially, muscle impressions distinct or not, transclypeal suture entire, clypellus with profile continuing contour of clypeus.

Thorax with pronotal width less than transocular width of crown, lateral margins parallel, dorsopleural carinae complete or not, disk not sculptured, without pubescence; scutellum not transversely striate behind transverse sulcus. Forewing without a distinctly delimited membrane, with bases of three anteapical cells located proximal to claval apex, with four apical cells of which base of outermost is more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, attenuate and angulate apically, with macrosetae located on apical half, pygofer processes absent. Plates short, triangular, fused basally, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae. Style not extending posteriorly nearly as far as apex of connective, narrowed and truncate apically, without an anteapical lobe. Aedeagus with dorsal apodemes not nearly as long as shaft which extends posterodorsally and with its apex bearing a short median

ventral lobe, without processes. Paraphysis unpaired, not median, curved dorsally, tapered, and acute at apex.

Female abdominal sternum VII well produced, gradually tapered to narrowly rounded apex. Genital chamber without sclerites. Ovipositor with second valvulae much as illustration of *Scopogonalia subolivacea* (Stål) (fig. 435). Pygofer much as in *subolivacea*.

Segonalia steinbachi, n. sp., the only species known in the genus, occurs in Bolivia. The genus is close to *Crossogonalia*, new genus, but differs in that the pronotum is narrower than the transocular width of the head, the plates do not extend as far posteriorly as the posterior pygofer margin, the apical margin of the pygofer is acute, the connective is longer, and the paraphysis is unpaired and asymmetrical.

Segonalia steinbachi, NEW SPECIES

FIGURE 813

Structural characters as in generic description. Base, narrowly, and apex of crown, all of pronotum, and base of scutellum, black; remainder of crown and apex of scutellum, ivory. Forewing brown to blackish-brown, each wing with a spot occupying base of clavus and extending slightly onto corium; claval apex, and a spot of variable size on corium opposite claval apex, yellow. Clypeus

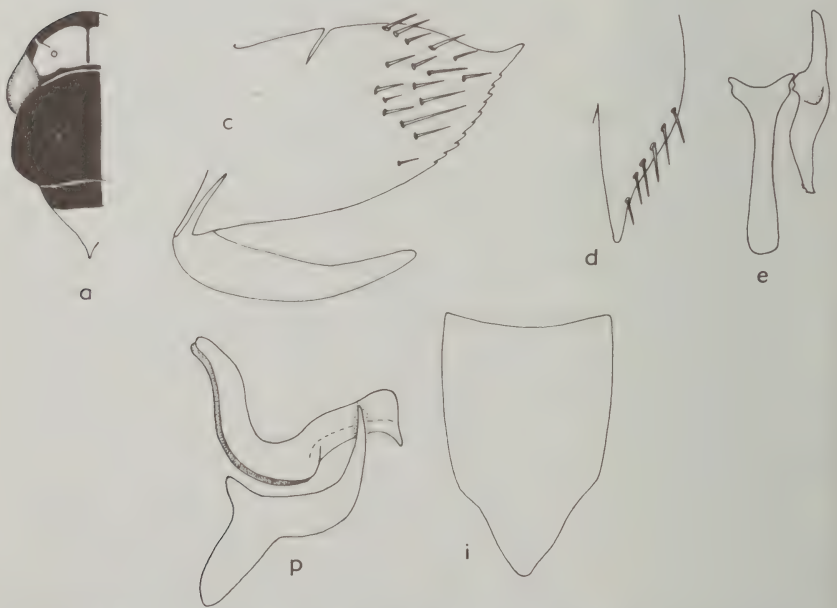


FIGURE 813.—*Segonalia steinbachi*, n. sp. (*i* from holotype; remainder from topotype; sternum IX not shown in *c*): *p*, Aedeagus and paraphysis, from lateral view.

black; clypellus brown to black medially, proepimeron with a black area bordering dorsopleural carina, genae and remainder of thoracic pleura varying from yellow to dark, legs yellow.

Holotype male and three females, Santa Cruz, Bolivia (J. Steinbach) (MCZ).

The species is named in honor of the collector.

136. CORONIGONALIA, NEW GENUS

FIGURES 814, 815

Type-species: *Tettigonia spectanda* Fowler.

Length 5.8-6.6 mm.

Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from approximately one-half to almost six-tenths interocular width and from three-tenths to four-tenths transocular width, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown with or without a shallow transverse concavity across ocelli, without a median fovea, surface of crown without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins almost vertical and almost rectilinear; clypeus convex or slightly flattened medially, muscle impressions distinct or not, clypellus with contour of its lower portion more nearly horizontal than remainder of its profile.

Thorax with pronotal width less than, equal to, or greater than transocular width of head, lateral margins parallel or convergent anteriorly, dorsopleural carinae complete, posterior margin shallowly concave, disk without sculpturing, not pubescent; scutellum usually not transversely striate behind transverse sulcus. Forewing with membrane including at least inner half of inner apical cell, veins not elevated, distinct or not in color from remainder of wing surface, with three anteapical cells of which the bases are proximal to claval apex, without supernumerary crossveins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly, with apex narrowly rounded posterodorsally, with a number of discal macrosetae on apical half; pygofer processes arising on dorsal margin. Plates slender, triangular, tapering gradually, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae. Style not extending posteriorly as far as apex of connective, truncate apically, with a lobe near midlength of shank. Aedeagus varying interspecifically, processes usually absent, very short when present. Paraphyses present, biramous, symmetrical.

Female (unknown in *C. evexa,* n. sp.) abdominal sternum VII moderately produced posteriorly and angulate or slightly emarginate at apex. Genital chamber with or without a large sclerotized lobe from its dorsal wall.

Ovipositor with second valvulae similar in form to those of *Graphogonalia*, new genus (fig. 810), each toothed through most of portion beyond basal curvature.

Species of *Coronigonalia* are similar in having a red or orange marginal band at the anterior coronal margin, a character they share with the new genera *Coronigoniella, Stephanolla*, and *Ferrariana*. A few species in other genera are banded similarly (e.g. *Hadria dominicana* (Dozier), *H. hispaniola* (Dozier), and *Sibovia pileata* (Fowler)).

Coronigonalia occurs in Costa Rica and Panama. The genus is related to *Graphogonalia*, new genus, from which species may be separated by the red-margined crown in *Coronigonalia*. It is also close to *Coronigoniella* in the discussion of which distinguishing characters are noted.

SPECIES OF *CORONIGONALIA*

evexa, n. sp. Costa Rica.
spectanda (Fowler), 1900d:285 (*Tettigonia*). Costa Rica, Panama. New combination.

KEY TO MALES OF *CORONIGONALIA*

Aedeagal shaft with a pair of short angular processes near base and with its apex curved dorsally and acute ..... *evexa*, n. sp.
Aedeagus without any processes ..... *spectanda* (Fowler) (fig. 814)

Coronigonalia evexa, NEW SPECIES

FIGURE 815

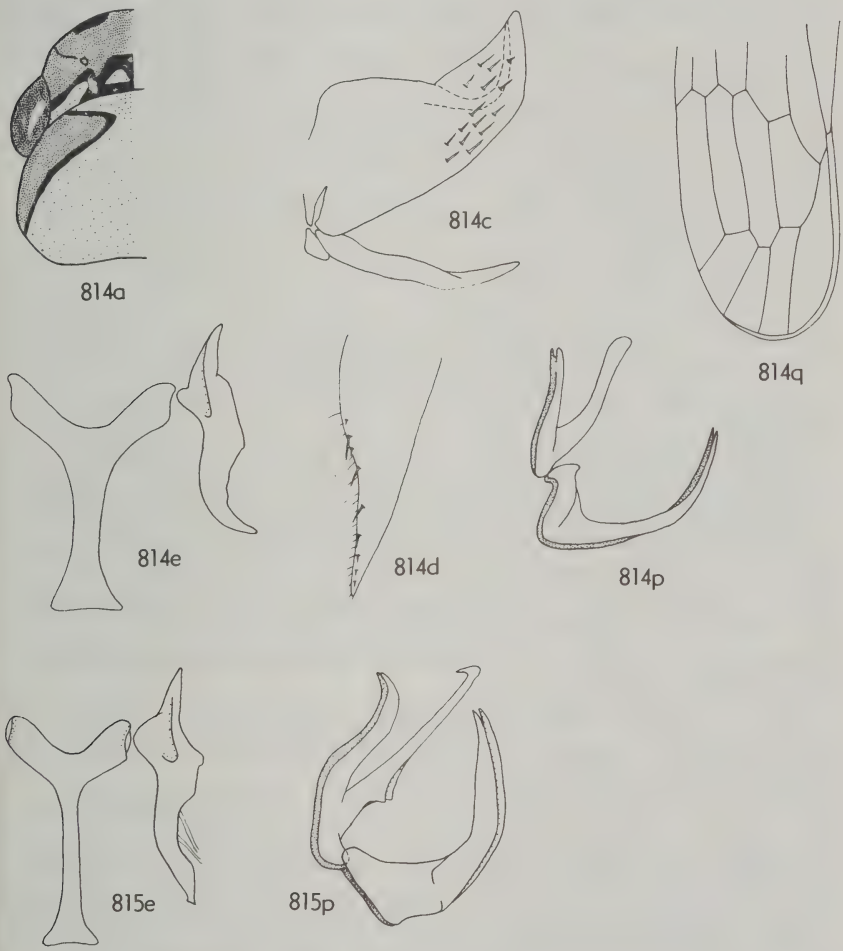
Length of male 5.8 mm. Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown slightly more than one-half interocular width and slightly less than four-tenths transocular width, ocelli located slightly before a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown; clypeus convex, muscle impressions distinct. Thorax with pronotal width approximately equal to transocular width of head, lateral margins convergent anteriorly; forewing with membrane restricted to inner portion of inner apical cell, veins distinct. Male pygofer with a slender acute process arising on dorsal margin near midlength, slightly curved smoothly ventrally then dorsally in lateral view; aedeagus long and slender, with a pair of short angular processes extending lateroventrad in basal half of shaft, and with apex of shaft curved dorsally and acute. Female unknown.

Head with crown bright orange, with a pair of marginal black spots on anterior margin near apex, with a coarsely serrate olive band at posterior margin, the three teeth dark-margined; pronotum olive with an orange arc bordering each lateral margin, strongly convergent anteriorly, almost confluent with its complement behind a narrow anterior marginal green band; scutellum olive with a pair of weak narrow longitudinal black bands near midline, each forming a loop near anterior margin; forewings deep green with veins slightly paler, with a broad, complete, orange costal border, continued into apices of apical cells but fading, becoming obsolete at apex of inner

apical cell; clypeus pale with a median Y-shaped black marking (upper apices forming black spots visible at apex in dorsal view); thoracic pleura sordid tan marked with black; legs sordid tan, tibial setae of row 1 mostly black.

Holotype male, Waldeck, Costa Rica, September 22, 1936 (C. H. Ballou) (USNM). A second specimen from Turrialba, Costa Rica is missing from the point, except for a hindwing, but the male genitalia are intact, in a vial of glycerine.

C. evexa, new species, is closely related to *C. spectanda* (Fowler), but the aedeagal shaft of the latter is without processes.



FIGURES 814, 815.—814, *Coronigonalia spectanda* (Fowler) (from specimen from Alhajuelo, Panama Canal Zone): *p,* Aedeagus and paraphyses, from lateral view; *q,* forewing apex. 815, *C. evexa,* n. sp., holotype: *p,* Aedeagus and paraphyses, from lateral view.

137. CORONIGONIELLA, NEW GENUS

FIGURES 816-833

Type-species: *Graphocephala spinosa* Osborn.

Length 5.1-8.7 mm.

Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly more than one-half to slightly more than seven-tenths interocular width and from one-third to approximately one-half transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle or slightly closer to latter, crown with or without a shallow transverse concavity across ocelli, without a median fovea, surface of crown without sculpturing or setae, lateral clypeal sutures extending onto crown to or near ocelli; antennal ledges not protuberant, in lateral view with anterior margins varying from vertical to oblique and from rectilinear to convex; clypeus usually convex medially, clypellus with contour of its lower portion usually continuing profile of clypeus.

Thorax with pronotal width equal to or greater than transocular width of head, lateral margins convergent anteriorly, other thoracic characters as in *Coronigonalia*, new genus. Forewing with veins distinct, with three anteapical cells, of which the base of the innermost is opposite claval apex, or nearly so (exception: *C. rubiella*, n. sp.); other forewing characters as in *Coronigonalia*. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres in most species, other characters as in *Coronigonalia*.

Male genitalia: Pygofer not as strongly produced posteriorly as in *Coronigonalia* (exception: *C. truncata*, n. sp.), apex variable interspecifically, with a number of discal macrosetae on apical half; pygofer processes present (exception: *C. baguensis*, n. sp.), variable interspecifically but usually arising along ventral pygofer margin. Plates triangular, usually extending as far, or almost as far posteriorly as pygofer apex, each with uniseriate macrosetae. Style usually extending as far posteriorly as apex of connective or farther, variable apically, with a lobe near midlength of shank. Aedeagus variable interspecifically. Paraphyses absent.

Female abdominal sternum VII with a median posterior acutangular process. Ovipositor with second valvulae each toothed through most of dorsal margin, the teeth widely spaced, apex acute.

Specimens of *Coronigoniella*, new genus, have a red to orange-margined crown and are similar in appearance to specimens of the new genera *Coronigonalia* and *Stephanolla*. *Coronigoniella* occurs in the region from Costa Rica, Trinidad and French Guiana south to Brazil and Peru. Males may be distinguished from *Coronigonalia* and *Stephanolla* by their symmetrical genitalia and lack of paraphyses. Females of *Coronigoniella* have the abdominal sternum VII slender and acute at its apex.

I have studied the types of *Graphocephala humeralis*, *G. lineola*, and *G. spinosa*, all described by Osborn. I have based my identification of *Cicada marginella* Fabricius on the female lectotype and specimens I believe are conspecific with it.

SPECIES OF *CORONIGONIELLA*

(*Known only from female)

baguensis, n. sp. Peru.
beieri, n. sp. Peru.
bonita, n. sp. NE. Brazil.
caquetana, n. sp. Colombia.
formosula, n. sp. Costa Rica, Panama, Venezuela.
lineola (Osborn), 1926b:231 (*Graphocephala*). Colombia, Venezuela. New combination.
humeralis (Osborn), 1926b:231 (*Graphocephala*). New synonymy.
maldonadoi, n. sp. Venezuela.
**marginella* (Fabricius), 1787a:271 (*Cicada*). French Guiana. New combination.
metana, n. sp. Colombia.
ostenta, n. sp. Panama, Ecuador, Peru.
partita, n. sp. Ecuador.
rohweri, n. sp. Ecuador.
rubiella, n. sp. Costa Rica, Panama Canal Zone.
rubrahua, n. sp. Peru.
spinosa (Osborn), 1926b:232 (*Graphocephala*). Brazil. New combination.
tiarae, n. sp. Trinidad Is., Tobago Is., Venezuela.
truncata, n. sp. Peru.
yara, n. sp. NE. Brazil.

KEY TO MALES OF *CORONIGONIELLA*

(*C. marginella* (F.) is not included)

1. Aedeagus in lateral view slender and elongate, with a pair of processes arising dorsally near midlength of shaft, the processes directed dorsally ..... *spinosa* (Osborn) (fig. 816)
   Aedeagus in lateral view usually not as slender, not as elongate, without processes near midlength, or if present then not directed dorsally 2

2. Styles broadly truncate apically (fig. 818*e*)
   rubrahua, n. sp., page 1015
   Styles not, or narrowly truncate apically 3

3. Aedeagus in lateral view broadened apically, truncate, and with short apicoventral acutangular processes (fig. 822*f*)
   truncata, n. sp., page 1022
   Aedeagus not as above, if broadened apically, then without acutangular processes (fig. 819*f*) 4

4. Pygofer acute apically, and in caudoventral view with an additional acute apical process ..... *bonita,* n. sp., page 1007
   Pygofer not so, occasionally with two processes on each side, but one of these anteapical, and pygofer rounded apically or truncate in lateral view 5

5. Aedeagus very short, broad and truncate apically
   metana, n. sp., page 1009
   Aedeagus not so 6

6. Aedeagus with apical processes or anteapical processes near apex (additional processes may be located more basally) 7
Aedeagus without processes or with processes located near midlength of shaft only 9

7. Aedeagus with paired apical processes and an additional pair of processes located anteapically ..... *beieri*, n. sp., page 1017
Aedeagus with only a single pair of processes 8

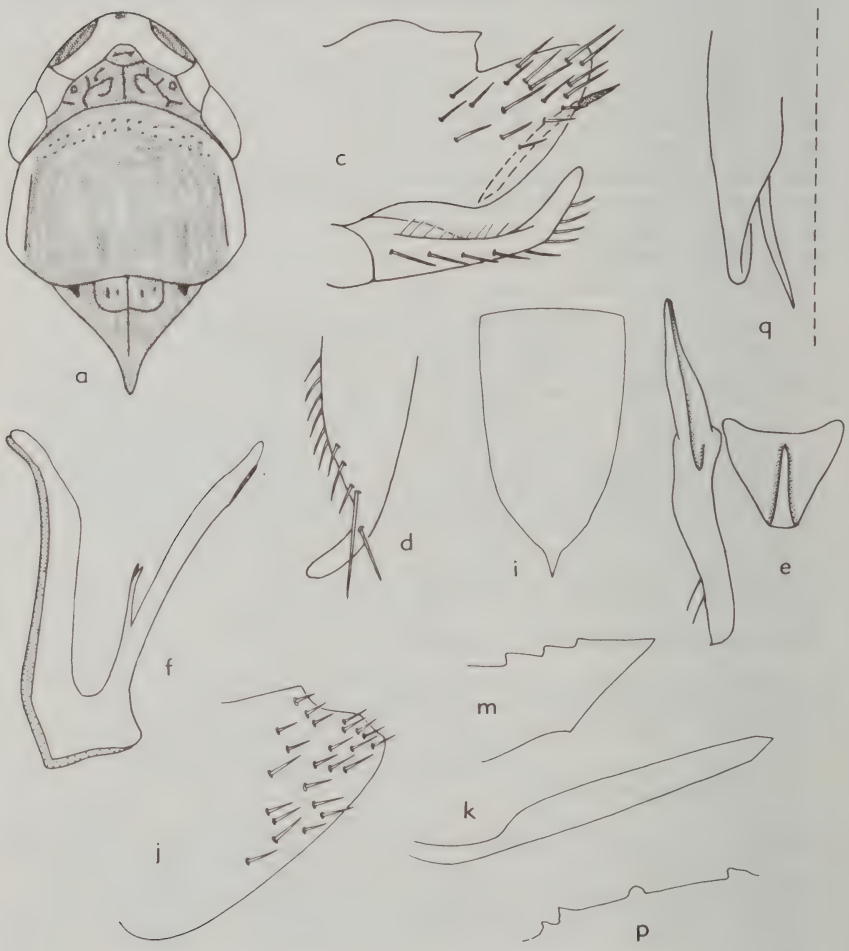


FIGURE 816.—*Coronigoniella spinosa* (Osborn) (*a* from holotype; remainder from specimens from Chapada, Brazil): *p*, Basalmost teeth of second valvula; *q*, male pygofer apex, left side, from caudoventral view.

8. Pygofer process arising ventrally, elongate and slender; aedeagal processes extending basally along dorsal margin of shaft in lateral view *ostenta,* n. sp., page 1013
   Pygofer processes arising posteroventrally, very short and abruptly tapered; aedeagal processes extending basally along lateral margins of shaft in lateral view ..... *yara,* n. sp., page 1023

9. Aedeagus with a pair of processes arising ventrally on atrium and exceeding apex of shaft ..... *baguensis,* n. sp., page 1020
   Aedeagus without atrial processes 10

10. Aedeagus with a pair of very short retrorse processes near midlength of shaft ..... *lineola* (Osborn) (fig. 817)
    Aedeagus without processes 11

11. Pygofer with two pairs of processes on each side in ventral view *tiarae,* n. sp., page 1011
    Pygofer with a single process on each side 12

12. Pygofer process arising basiventrally at base of pygofer *rubiella,* n. sp., page 1013
    Pygofer process arising more distally on ventral or posteroventral margin, or arising at apex 13

13. Aedeagal shaft strongly (fig. 830*f*) or weakly (fig. 832*f*) crescentiform in lateral view 14
    Aedeagal shaft nearly straight, or weakly biundulate in lateral view 15

14. Pygofer processes arising ventrally ..... *caquetana,* n. sp., page 1017
    Pygofer processes arising apically ..... *maldonadoi,* n. sp., page 1020

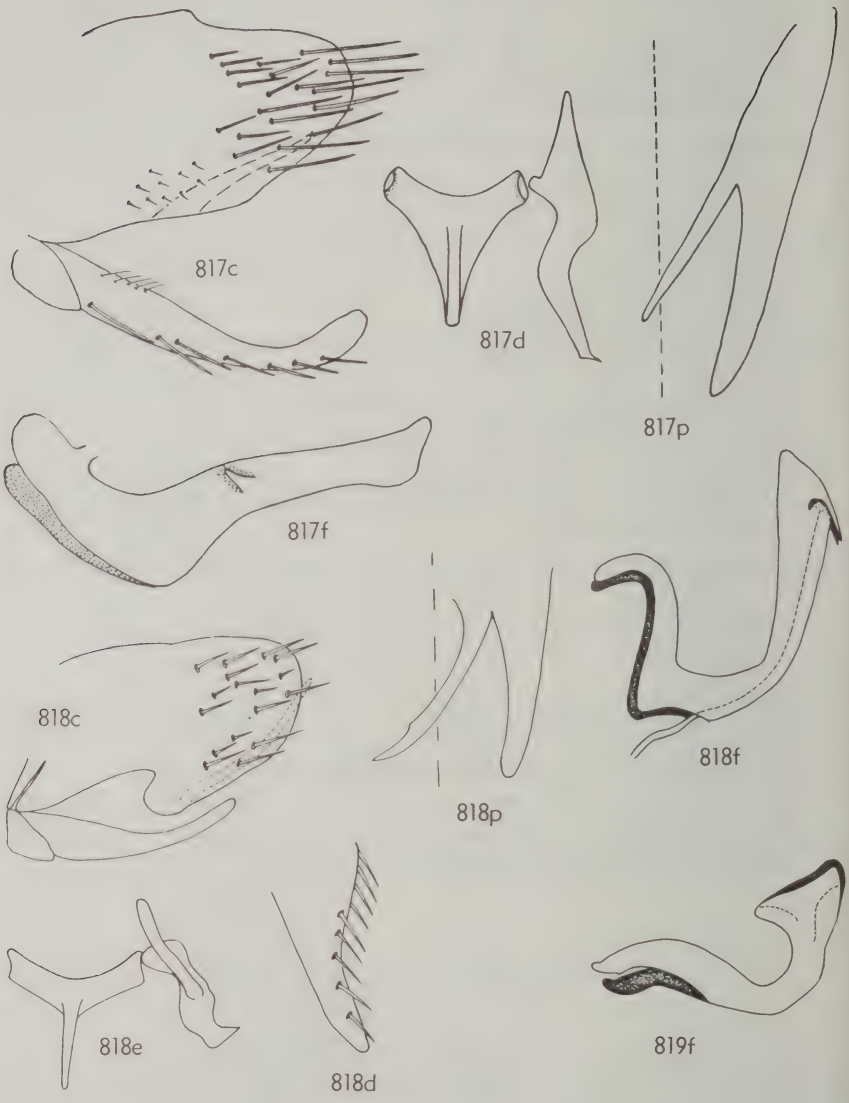
15. Each pygofer process crossing its complement at median line 16
    Pygofer processes not crossed ..... *rohweri,* n. sp., page 1011

16. Pygofer truncate apically in lateral view ..... *formosula,* n. sp., page 1018
    Pygofer broadly rounded apically in lateral view *partita,* n. sp., page 1019

Coronigoniella bonita, NEW SPECIES

FIGURE 824, PAGE 1014

Length of male 6.5 mm, of female 6.7-6.9 mm. Head with median length of crown varying from slightly less than six-tenths to slightly less than two-thirds interocular width and approximately four-tenths transocular width, ocelli each slightly closer to adjacent anterior eye angle than to median line of crown, crown with transverse concavity weak or absent, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer narrowed apically and tapering to end in two acute apical processes; plates extending posteriorly beyond pygofer apex, each with uniseriate macrosetae; style extending posteriorly beyond apex of connective,



FIGURES 817-819.—817, *Coronigoniella lineola* (Osborn) (from specimen from Minca, Colombia): *p*, Male pygofer apex, right side, from caudoventral view. 818, *C. rubrahua*, n. sp. (*p* from specimen from Tingo María, Peru; remainder from holotype): *p*, Male pygofer apex, right side, from caudoventral view. 819, *C. metana*, n. sp., holotype.

acute apically, aedeagus with a ventral unpaired preatrial portion, shaft with ventral margin concave in lateral view, shaft gradually tapered in apical half.

Crown with anterior margin broadly orange, disk green finely inscribed with black; pronotum dark green with lateral margins broadly orange; scutellum marked as disk of crown, forewing dark green with a broad costal orange band extending to apex of outer anteapical cell, apical cells translucent; face and thoracic pleura sordid greenish to purplish, legs dull brown to dull purple.

Holotype male, January 18, 1883, three females January 15, January 27, and February 2, 1883 and one specimen without abdomen, February 19, 1883 "Bnito", Prov. Pernambuco, Brazil (USNM).

C. bonita, n. sp., resembles *C. tiarae,* n. sp., in the structure of the male genitalia, but the two pygofer processes of *bonita* are both nearly apical, in contrast to a distinctly anteapical process in *tiarae* in addition to the apical one. The plates are longer relative to the pygofer in *bonita* and the style extends farther posteriorly relative to the connective.

Coronigoniella metana, NEW SPECIES

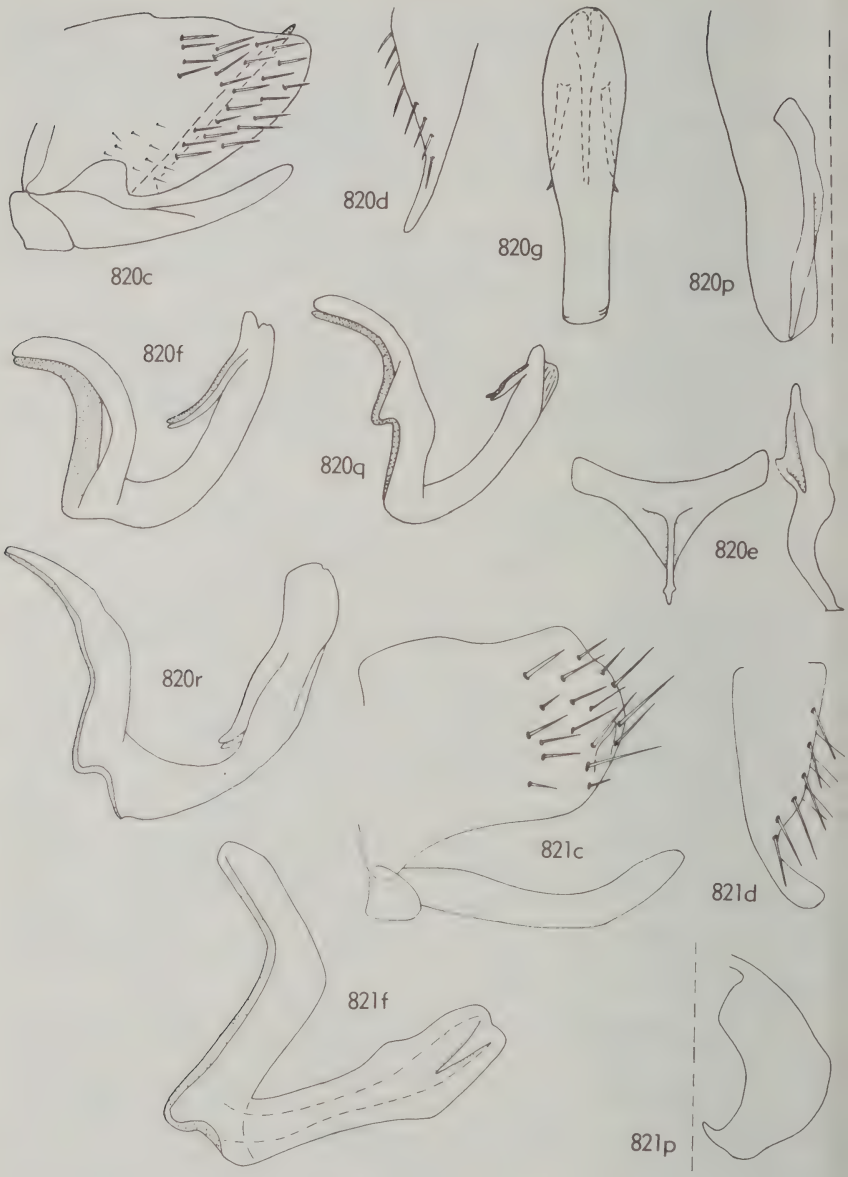
FIGURE 819, PAGE 1008

Length of male 6.0-6.2 mm, of female 6.4 mm. Head with median length of crown varying from slightly more than one-half to slightly more than six-tenths interocular width and from slightly more than one-third to slightly less than four-tenths transocular width, crown without a transverse concavity, lower portion of clypellus with contour more nearly horizontal than profile of remainder of face, other head characters as in *C. bonita,* n. sp. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer narrowly rounded apically, with a slender elongate process arising from a lobe on ventral margin, extending posterodorsally almost to apex of pygofer; plates not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly slightly beyond apex of connective, obliquely truncate apically; aedeagus without a preatrium, shaft short, with ventral margin convex in lateral view, broadened apically and truncate.

Color of crown, pronotum, and scutellum as in *C. bonita,* n. sp. (above), except that ground color of disk of crown and scutellum is tan; forewing as in *bonita* but with orange costal band continued around apical margin through outer apical cells and into apical portion of inner apical cell; face and thoracic pleura sordid greenish, legs brown except tarsal apices of pro- and mesothoracic pairs and apical portions of femora and entire tarsi of metathoracic legs which are black.

Holotype and two additional males and three females, 3 miles west of Villavicencio, Meta, Colombia, 920 m., March 11, 1955 (E. I. Schlinger and E. S. Ross) (CAS).

C. metana, n. sp., is similar to *C. ostenta,* n. sp. (below), in the structure of those parts of the male genitalia not illustrated in fig. 819, but the shorter truncate aedeagal apex of *metana* is distinctive.



FIGURES 820, 821.—820, *Coronigoniella ostenta,* n. sp. (*q* from holotype; *g, r,* from Callanga, Peru; remainder from Ecuador; dorsal apodemes not shown in *g*): *p,* Male pygofer apex, left side, from caudoventral view; *q, r,* aedeagus from lateral view. 821, *C. yara,* n. sp., holotype: *p,* Male pygofer apex, right side, from caudal view.

Coronigoniella rohweri, NEW SPECIES

FIGURE 829, PAGE 1021

Length of male 5.9-6.0 mm, of female 6.0-6.5 mm. Head with median length of crown varying from slightly less than six-tenths to two-thirds interocular width and four-tenths or slightly less than four-tenths transocular width, ocelli each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with transverse concavity absent, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer broadly rounded apically, with process very short, anteapical, very close to posteroventral pygofer margin (easily overlooked); plates extending posteriorly as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly beyond apex of connective, rounded apically; aedeagus without a preatrium, shaft with ventral margin rectilinear in lateral view, shaft parallel-margined.

Color very much as in *C. bonita,* n. sp.

Holotype and two additional males and four females, Zaruma, Ecuador, November 26, 1915 (F. W. Rohwer) (USNM).

C. rohweri, n. sp., is named in honor of the collector of the type-series. The straight aedeagal shaft, without processes, and the very small pygofer processes are distinctive characters.

Coronigoniella tiarae, NEW SPECIES

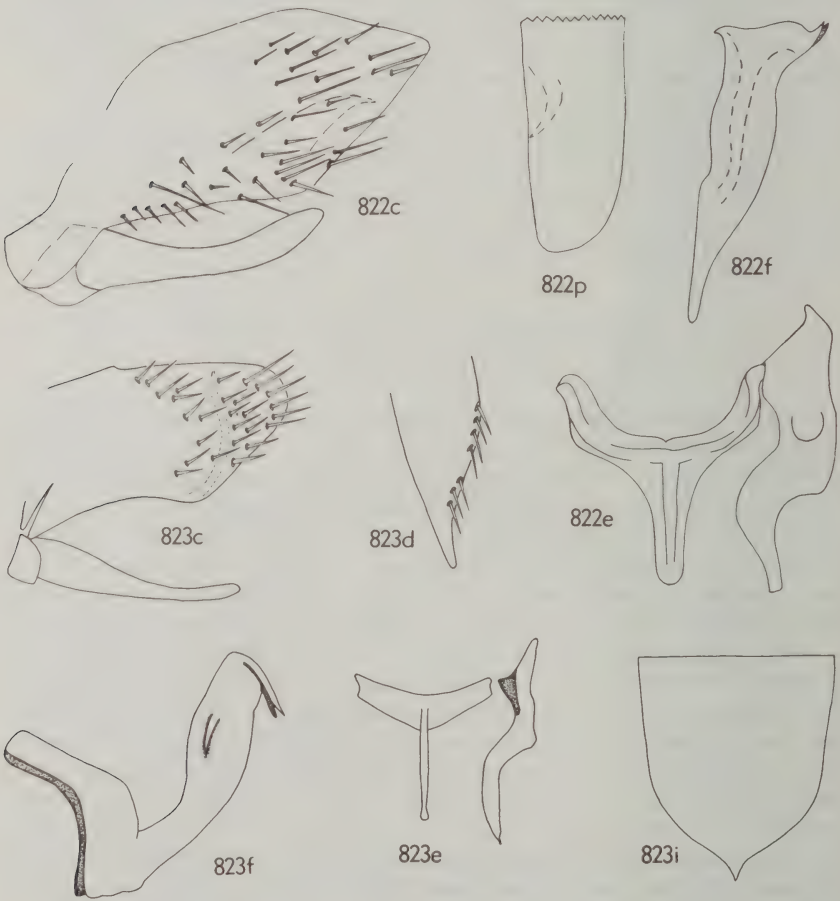
FIGURE 825, PAGE 1014

Length of male 5.5-6.0 mm, of female 6.3-6.5 mm. Head with median length of crown varying from slightly less than six-tenths to almost seven-tenths interocular width and from slightly more than one-third to slightly less than one-half transocular width, ocelli each approximately equidistant from median line of crown and adjacent anterior eye angle, crown with or without a transverse concavity (weak when present), clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer tapered to narrowly rounded apex, in lateral view with a process arising from inner wall near apex and another arising distinctly more basiventrally on posteroventral pygofer margin, both processes slender and acute; plates extending posteriorly beyond pygofer apex, each with uniseriate macrosetae; style extending posteriorly beyond apex of connective, narrowly rounded apically; aedeagus without a preatrium, shaft in lateral view with ventral margin concave in basal half, convex in apical half and with a pair of anteapical ventral flanges, shaft with minute verrucae (visible at magnification of more than 150 diameters), without processes.

Color as in *C. bonita,* n. sp.

Holotype and two additional males and four females, Botanical Gardens, Port-of-Spain, Trinidad, October 13, 1918 (Harold Morrison); one male and three females, Archbold Estate, Roxborough, Tobago, November 6, 1918 (H.

Morrison); two females, River Estate, Trinidad, October 16, 1918 (H. Morrison); one male and two females, Trinidad, W. I., June 26, 1902; one female, Montserrat, Trinidad, June (August Busck); two females, Trinidad, W. I., July 12, 1902; three females, Trinidad Island, September, 1902; one female, Trinidad, W. I. (P. R. Uhler); one female, St. Augustine, Trinidad, B. W. I., February 1942 (Fennah); one male and one specimen without abdomen, Los Teques, Venezuela, March 14, 1938 (C. H. Ballou) on *Eryabotrya japonica* (Thunb.); two females, Cordillera de Costa, Venezuela, March 18, 1938, 1100 m., on grass (one collected by V. Barnes, Jr., and one by J. Barnes); one specimen without abdomen, El Valle, Venezuela, October 24, 1939 (C. H. Ballou) on *Scabiosa atropurpurea* L.; one male, Caracas, Venezuela, August-September, 1949 (A. Mirsa); one male, Caracas, Venezuela, October,



FIGURES 822, 823.—822, *Coronigoniella truncata,* n. sp., holotype: *p,* Male pygofer apex, left side, from ventral view. 823, *C. beieri,* n. sp. (*i* from specimen from Peru; remainder from holotype).

1950 (N. L. H. Krauss) (all USNM). Thirteen specimens, Rancho Grande, near Maracay, Venezuela 1946: three males and two females, March 28; one specimen without abdomen, March 25; one male, April 24; one male and one specimen without abdomen, June 11; two females, June 17; one female, June 26; and one female, without date (Bronx Zoo).

C. tiarae, n. sp., is most closely related to *C. bonita,* n. sp., both of which have two pairs of pygofer processes. The processes are more widely separated in *tiarae* and the aedeagus is also distinctive.

Coronigoniella rubiella, NEW SPECIES

FIGURE 827, PAGE 1016

Length of male 7.5 mm. Head with median length of crown less than six-tenths interocular width and from slightly more than one-third to approximately four-tenths transocular width, ocelli each approximately equidistant from median line of crown and adjacent anterior eye angle, crown with transverse concavity weak, clypellus with contour of its lower portion more nearly horizontal than profile of remainder of face. Hindleg with length of first tarsomere not or only slightly greater than combined length of two more distal tarsomeres. Male pygofer rounded apically, with a pair of slender, elongate, acute processes arising basiventrally and extending posterodorsally almost to apical pygofer margin; plates extending posteriorly almost as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly approximately as far as apex of connective, truncate apically; aedeagus with a ventral preatrial portion which projects slightly posteriorly beneath base of shaft as an unpaired ventral process, shaft with ventral margin convex in lateral view, shaft narrowed and slightly recurved at apex.

Crown with a conspicuous large apical black spot, otherwise with color as in *C. bonita,* n. sp.; pronotum as in *bonita* but paler green (type) or not, with a group of indistinct black markings near and parallel to anterior margin; forewing as in *bonita* but with orange costal strip extending through outer apical cells into base of inner apical cell; face, thoracic pleura and legs yellow.

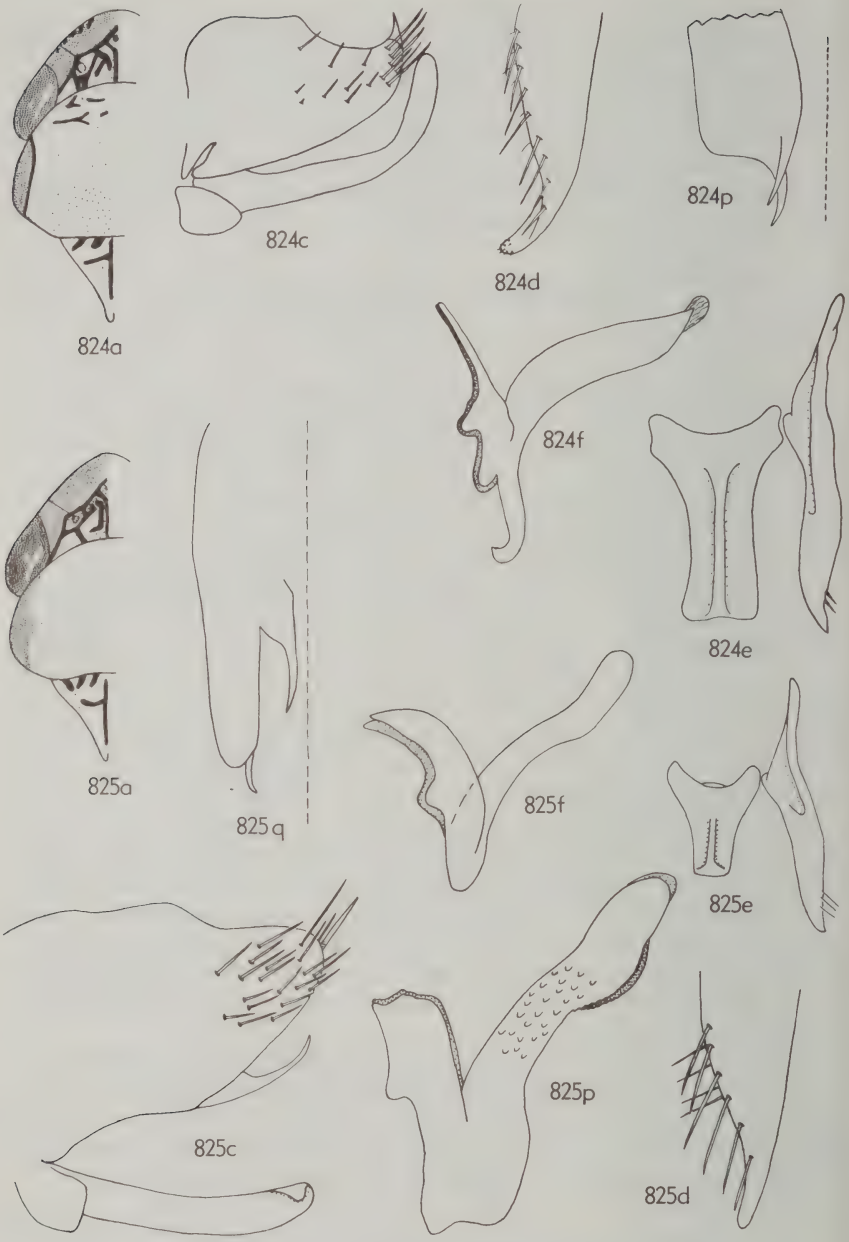
Holotype male, Barro Colorado Island, Panama Canal Zone, May 19, 1967 (D. M. DeLong and C. A. Triplehorn) and one male, Suiza, Turrialba, Costa Rica (P. Schild) (OSU).

C. rubiella, n. sp., is larger than other species in the genus. In addition to the characters used in the key, the forewings of *rubiella* have the base of the outer anteapical cell located beyond the claval apex (brachial cell exceeds claval apex) and the length of the first hind tarsomere equal to, or only slightly longer than combined length of more distal tarsomeres.

Coronigoniella ostenta, NEW SPECIES

FIGURE 820, PAGE 1010

Length of male 6.0-6.8 mm. Head with median length of crown slightly less than two-thirds interocular width and from four-tenths to slightly less than



FIGURES 824, 825.—824, *C. bonita*, n. sp., holotype: *p*, Male pygofer apex, right side, from caudoventral view. 825, *C. tiarae*, n. sp. (*a* from holotype; *d*, *p*, from specimen from Trinidad; remainder from Maracay, Venezuela): *p*, Aedeagus from lateral view; *q*, male pygofer, right side, from ventral view.

one-half transocular width, ocelli each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with transverse concavity absent, clypellus with contour of its lower portion slightly more nearly horizontal than profile of remainder of face. Hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer narrowly rounded apically, with an elongate, slender, acute process arising from a lobe near middle of ventral pygofer margin and extending posterodorsally; plates not extending as far posteriorly as pygofer apex, each with uniseriate macrosetae; style extending posteriorly beyond apex of connective, truncate apically; aedeagus without a preatrium, shaft with ventral margin convex in lateral view, with a pair of anteapical processes arising near apex, extending basiventrally, diverging or not from upper margin of shaft in lateral view, each process slender, slightly sinuous, acute apically.

Color of crown, pronotum, and scutellum as in *C. bonita,* n. sp., but with scutellum not as closely inscribed with black as disk of crown, forewing with orange costal band extending into apical cells but not attaining inner apical cell, femora of all legs orange at base on outer surface, other color characters as in *bonita.*

Holotype male Cerro Azul, Panama, October 3, 1952 (F. S. Blanton) and two males, Callanga, Peru (USNM). One male, Río Arajuno, Napo Watershed, Ecuador, May, 1941 (Clark-Macintyre) (NCS).

C. ostenta, n. sp., is similar to *C. rubrahua,* n. sp. in a number of characters, but differs markedly in the form of its longer styles and in that the aedeagal processes arise from the dorsal (anterior) margin of the aedeagal shaft.

Coronigoniella rubrahua, NEW SPECIES

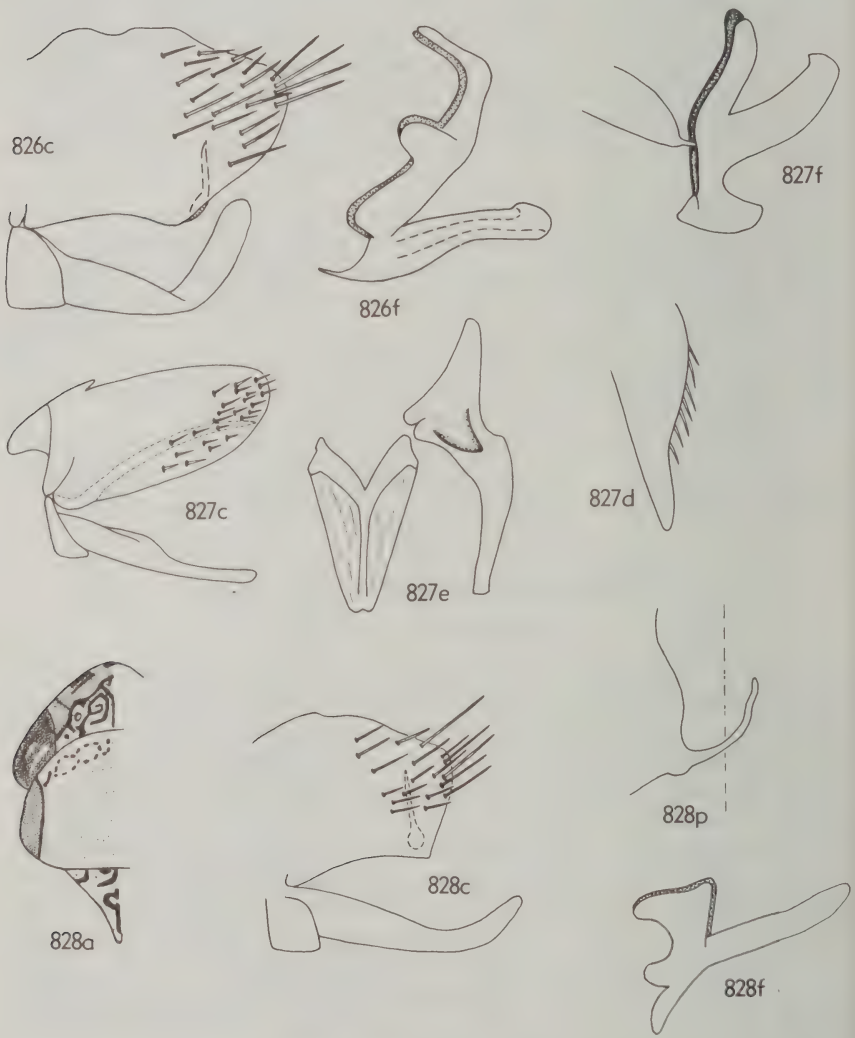
FIGURE 818, PAGE 1008

Length of male 6.0-6.3 mm, of female 6.3-6.4 mm. Head with median length of crown varying from slightly more than one-half to slightly less than two-thirds interocular width and from slightly more than one-third to slightly more than four-tenths transocular width, ocelli each approximately equidistant from adjacent anterior eye angle and median line of crown, crown without a transverse concavity, clypellus with contour of its lower portion slightly more nearly horizontal than profile of remainder of face. Hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer and plates as in *C. ostenta,* n. sp; style extending posteriorly approximately as far as apex of connective, broad and truncate apically; aedeagus without a preatrium, shaft with ventral margin convex in lateral view, gradually broadened in apical half; with a pair of short slender acute processes arising at apex, extending ventrally, diverging from lower margin of shaft in lateral view.

Color of crown, pronotum, and scutellum as in *C. bonita,* n. sp., but with pronotum tinged with blue and with a number of obscure black markings near its anterior margin, and with scutellum not as heavily inscribed with

black as in *bonita;* forewing as in *bonita* but with orange costal band extending into outer apical cells; face and thoracic pleura yellow occasionally suffused with green, and on the face occasionally with orange; legs with orange knee-spots as in *ostenta*.

Holotype and one additional male and two females, Monsón Valley, Tingo María, Peru, September 23, 1954 (E. I. Schlinger and E. S. Ross); one male,



FIGURES 826-828.—826, *Coronigoniella partita,* n. sp., holotype. 827, *C. rubiella,* n. sp., holotype. 828, *C. formosula,* n. sp., holotype: *p,* Male pygofer apex, left side, from caudal view.

same data except October 28, 1954; and one female, same data except November 2, 1954 (CAS).

C. rubrahua, n. sp., is closely related to *ostenta,* and to *C. beieri,* n. sp., in the discussions of which distinguishing characters are treated.

Coronigoniella beieri, NEW SPECIES

FIGURE 823, PAGE 1012

Length of male 8.4 mm, of female 8.7 mm. Head with median length of crown slightly less than six-tenths interocular width and from three-tenths to slightly more than one-third transocular width, ocelli each approximately equidistant from adjacent anterior eye angle and median line of crown, crown with transverse concavity absent, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer and plates much as in *C. rubrahua,* n. sp., but with ventral lobe of pygofer margin, at base of process, much weaker, pygofer process extending dorsally; style extending posteriorly as far as or farther than apex of connective and acute apically; aedeagus much as in *rubrahua* but with ventral margin more strongly convex in lateral view and with a pair of lateral retrorse processes slightly beyond midlength of shaft.

Crown, pronotum and scutellum as in *C. bonita,* n. sp., but with a number of obscure black markings near anterior margin of pronotum, and with the lateral marginal pronotal orange stripes bordered with black on their inner margins; forewing as in *bonita,* but with orange costal band extending only to base of outer anteapical cell; face, pleura, venter and legs dull golden, the proepimeron tinged with green, the legs with brown; knee spots orange, as in *C. rubrahua,* n. sp.

Holotype and one additional male and two females, Peru, 1905 (Ehrbacher) (NMV).

C. beieri, n. sp., is closely related to *C. rubrahua,* n. sp., but is readily separated from the latter by the truncate styles of the latter and the processes near the midlength of the aedeagal shaft of *beieri. C. beieri* is larger than *rubrahua* or *ostenta.*

C. beieri, n. sp., is named in honor of Doctor Max Beier of the Zoologische Abteilung of the Naturhistorisches Museum in Vienna, in gratitude for his most friendly cooperation during my studies in Vienna in 1962-1963.

Coronigoniella caquetana, NEW SPECIES

FIGURE 830, PAGE 1021

Length of male 6.0-6.4 mm, of female 6.4-6.5 mm. Head with median length of crown two-thirds interocular width and more than four-tenths transocular width, ocelli each slightly closer to adjacent anterior eye angle than to median line of crown, crown with a weak transverse concavity, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg

with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer broadly rounded apically, with a slender tapering process arising from a prominent lobe on ventral margin, extending posterodorsally slightly beyond apical margin of pygofer; plates not extending as far posteriorly as pygofer apex, each with uniseriate macrosetae; style extending posteriorly beyond apex of connective, obliquely truncate apically; aedeagus without a preatrium, shaft with ventral margin broadly convex in lateral view, only slightly tapered apically, apex concave in caudoventral view.

Crown as in *C. bonita*, n. sp., but disk olive yellow; pronotum as in *bonita* but with a broad group of vermiculate black markings near anterior margin, and with lateral marginal orange bands bordered mesally with a narrow black line; scutellum olive green with narrow black lines forming a median cruciate pattern and with a few additional small black markings near anterior margin; forewing dark green with a broad costal orange band curved apically to pass through apical cells into inner apical cell; face and thoracic pleura yellow to sordid purplish, legs yellow; hindleg with an orange spot on femur below knee.

Holotype male, Colombia, 1941 (L. Richter) (NCS). One male and one female, Caquetá, Morelia, Río Bodoguero, 430 m., Colombia, January 19-20, 1969 (Duckworth and Dietz); one female, Caquetá, Sucré nr. Km. 35, Colombia, January 24, 1969 (Duckworth and Dietz) (USNM). Holotype on indefinite loan to USNM from NCS.

The slender, regularly curved aedeagus, the very short connective and the concavely truncate aedeagal apex will separate *C. caquetana* from other species in the genus.

Coronigoniella formosula, NEW SPECIES

FIGURE 828, PAGE 1016

Length of male 5.1-5.6 mm, of female 5.6-6.7 mm. Head with median length of crown varying from six- to seven-tenths interocular width and from one-third to four-tenths transocular width, ocelli each closer to median line of crown than to adjacent anterior eye angle, crown without a transverse concavity, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere much greater than combined length of more distal tarsomeres. Male pygofer less strongly produced than in other species of the genus, obliquely truncate at apex and with a process arising on caudoventral angle, slender, acute, extending mesodorsally and crossing its complement; plates extending posteriorly beyond pygofer apex, each with uniseriate macrosetae; style extending posteriorly approximately as far as apex of connective, truncate apically; aedeagus with a short ventral unpaired preatrial portion, shaft with ventral margin almost rectilinear, except at apex, in lateral view, tapered in apical third.

Color of crown and pronotum as in *C. bonita*, n. sp., but with a number of small weak black markings near anterior margin of pronotum; scutellum olive, less heavily inscribed with black than crown; remainder as in *bonita*.

Holotype and five additional males and one female, Summit, Panama Canal Zone, October, 1946 (N. L. H. Krauss); two females, same data as preceding except date, September, 1946; one male and one female, same data except date, November, 1946; one male and one female, Paraíso, Canal Zone, January 17 and 16 respectively, 1911 (August Busck); one male, Ft. Sherman, Panama Canal Zone; one female, Mojinga Swamp, Ft. Sherman, Panama Canal Zone, August 23, 1951 (F. S. Blanton); one male, Madden Dam, Panama Canal Zone, October 3, 1952 (F. S. Blanton); one male, same data as preceding except date, October 10, 1952; one male, Monte Lirio, Canal Zone, August 27, 1923 (R. C. Shannon); one male, "Alcal de Diaz", October 10, 1952 (F. S. Blanton); one female, Galeta Point, Panama Canal Zone, December 29, 1956 (F. S. Blanton); one female, Pan de Azúcar, Panama Province, Panama, October 10, 1952 (F. S. Blanton); three males and twelve females, San Estebán, Venezuela, November 22-30, 1939 (Pablo Anduze) (USNM). Four males and two females, San Isidro del General, Costa Rica (D. L. Bounds) (NCS). Two males, Gamboa, Canal Zone, January 31, 1921 (J. G. Sanders); one female, same data except date, February 1, 1921; one male and one female, same data except date, February 16, 1921 (OSU). Two males and one female, 6 mi. east of Porto Bello, Panama, "XX Plantation", February 17, 1930 (T. O. Zschokke) (CAS).

C. formosula, n. sp., can be separated from other species in the genus by the truncate male pygofer apex.

Coronigoniella partita, NEW SPECIES

FIGURE 826, PAGE 1016

Length of male 6.0-6.8 mm. Head with median length of crown slightly greater than six-tenths interocular width and four-tenths or slightly more than four-tenths transocular width, ocelli each approximately equidistant from median line and adjacent anterior eye angle, crown without a transverse concavity, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer broadly rounded apically, with a short, slender, acute process arising behind middle of ventral pygofer margin, extending dorsally; plates extending posteriorly as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly as far as apex of connective, truncate apically; aedeagus with a short narrow ventral unpaired preatrial portion, shaft with ventral margin concave in lateral view, shaft narrowed near midlength, rounded apically.

Color of crown, pronotum, and scutellum as in *C. bonita,* n. sp.; forewings marked as in *bonita,* but with claval commissural margin with an orange border that is narrower than costal orange marking; face and thoracic pleura sordid yellow, latter greenish in some specimens, legs dull brown.

Holotype male and six additional males and seven females, Balzapamba, Ecuador, May 27, 1938, 700 m. (Wm. Clark-Macintyre) (NCS). Six males

and five females, Balzapamba, Ecuador, May 2, 1938 (Wm. Clark-Macintyre); one female, Guayas, Cuatro Hermanitas, Ecuador, September 22, 1955 (R. Levi Castillo) (USNM).

In addition to the characters used in the key, *C. partita,* n. sp., may be separated from other species in the genus by its orange claval commissural margins.

Coronigoniella maldonadoi, NEW SPECIES

FIGURE 832, PAGE 1022

Length of male 7.2-8.0 mm. Head with median length of crown approximately seven-tenths interocular width and one-half transocular width, ocelli each closer to adjacent anterior eye angle than to median line of crown, crown with a weak transverse concavity, clypellus with contour of its lower portion slightly more nearly horizontal than profile of remainder of face. Hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer truncate apically and with a slender tapering acute apical process that extends anteromesally across median line; plates extending posteriorly as far as pygofer apex, each with uniseriate macrostae; style extending posteriorly as far as apex of connective, truncate apically; aedeagus narrowed near base of shaft, crescentiform in narrow portion, without processes.

Crown dull yellow, marked with narrow black lines except broad anterior marginal border; anterior portion of scutellum with a dull yellow area parallel to anterior margin, remainder dark green; scutellum concolorous with crown, with four small black spots on anterior portion, the middle pair each surrounded by a narrow black circle, with a pair of short oblique black spots near apex; forewings dark green except a dull yellow stripe bordering costal margin, apical margin narrowly black; face, thoracic pleura, and legs pale yellow except black upper portion of clypeus and a black spot beneath each dorsopleural carina.

Holotype male, Rancho Grande, Aragua, Venezuela, July 5, 1968 (J. Maldonado C.) (USNM) One additional male, Puerto Cabello, Venezuela (RMS).

The distictive form of the aedeagus will separate *C. maldonadoi* from other species of the genus. The margin of the crown is not orange in the two specimens at hand, as in other species.

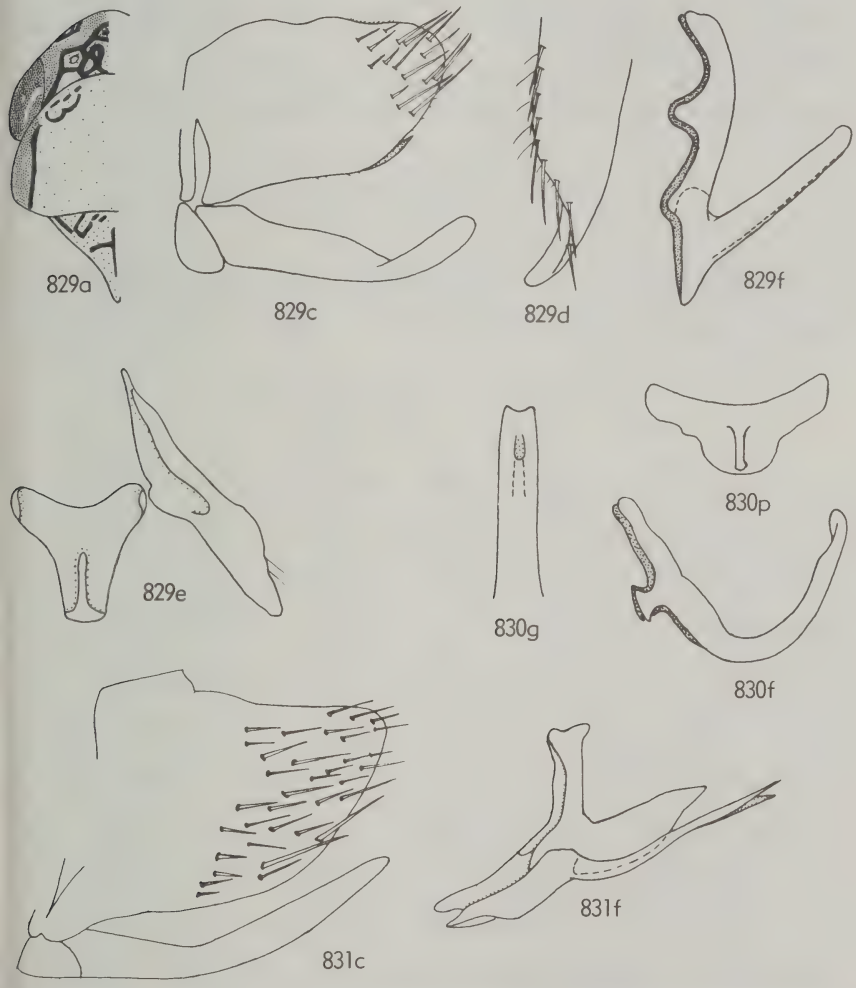
The species is named in honor of the collector of the holotype.

Coronigoniella baguensis, NEW SPECIES

FIGURE 831, PAGE 1021

Length of male 5.3 mm. Head with median length of crown from slightly less than six-tenths to two-thirds interocular width and from slightly less than four-tenths to more than four-tenths transocular width, ocelli each approximately equidistant from adjacent anterior eye angle and median line of crown,

crown without a transverse concavity, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere slightly greater than combined length of two more distal tarsomeres. Male pygofer narrowly rounded apically, without processes; plates extending posteriorly almost as far as pygofer apex, each with uniseriate macrosetae; style extending posteriorly as far as apex of connective, obliquely truncate apically; aedeagus short with ventral margin strongly convex at midlength, shaft tapered in apical half, a pair of aedeagal processes arising at base of atrium (which is a heavily sclerotized ring at base of abdominal segment X in



FIGURES 829-831.—829, *Coronigoniella rohweri,* n. sp., holotype. 830, *C. caquetana,* n. sp., holotype (only apex of aedeagus shown in *g*): *p,* Connective from dorsal view. 831, *C. baguensis,* n. sp., holotype.

this species), each slender, tapering, extending parallel to aedeagal shaft beyond apex of shaft.

Crown with anterior margin broadly orange, disk yellowish-green with fine black dots and vermiculations; pronotum with anterior portion marked as disk of crown, remainder dark green except a broad longitudinal orange band next to each lateral margin; scutellum yellowish-green faintly and sparsely marked with black; forewing green with a short vitta at base bordered mesally by claval suture, and a band parallel to costal margin, interrupted opposite base of outer anteapical cell and continuing across apical cells to outer margin of innermost, orange; face and thoracic pleura dull yellow, legs brownish with an orange spot at base of posterior tibia.

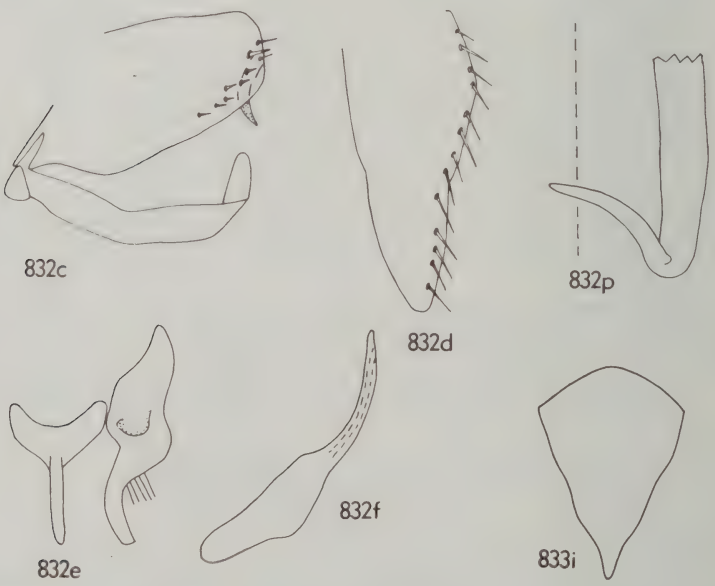
Holotype and one additional male, Bagua, Peru, May 19, 1967 (C. Korytkowski) (AMNH).

C. baguensis, n. sp., is distinct from other species in the lack of pygofer processes and the presence of atrial aedeagal processes.

Coronigoniella truncata, NEW SPECIES

FIGURE 822, PAGE 1012

Length of male 7.5 mm. Head with median length of crown six-tenths interocular width and approximately four-tenths transocular width, ocelli each closer to adjacent anterior eye angle than to median line of crown, crown



FIGURES 832, 833.—832, *Coronigoniella maldonadoi*, n. sp., holotype: *p*, Male pygofer apex, left side, from ventral view. 833, *C. marginella* (F.), lectotype.

without a transverse concavity, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer well produced, narrowly rounded posterodorsally, with a short, curved posteroventral process; plates not extending as far posteriorly as pygofer apex, each with uniseriate macrosetae; style extending posteriorly as far as apex of connective, narrowly truncate apically; aedeagus in lateral view narrow at base, gradually broadened to beyond midlength, apex very broadly truncate with a pair of short acute posterior apical processes and a single short acute anterior apical process.

Crown with anterior marginal orange border not including muscle impressions (much as in *C. spinosus* (Osborn), fig. 816*a*), disk sordid green with obscure dark vermiculations; pronotum with lateral orange borders curving mesally along humeral margins and lobed apically, anterior submarginal area continuing pattern of disk of crown, remainder dark green; scutellum greenish-yellow; forewings dark green with a submarginal orange stripe parallel to costal margin from near base to apical cells; face and thoracic pleura sordid yellow tinged with green; legs dull yellow with orange knee-spots.

Holotype male, Tingo María, Peru, July, 1948 (E. J. Hambleton) (USNM).

C. truncata, n. sp. may be separated from other species of *Coronigoniella* by the form of the aedeagus, broadened apically, truncate and bearing processes at apex.

Coronigoniella yara, NEW SPECIES

FIGURE 821, PAGE 1010

Length of male 5.6 mm. Head with median length of crown more than seven-tenths interocular width and slightly less than one-half transocular width, ocelli each approximately equidistant from median line of crown and adjacent anterior eye angle, crown without a transverse concavity, clypellus with contour of its lower portion continuing profile of remainder of face. Hindleg with length of first tarsomere much greater than combined length of two more distal tarsomeres. Male pygofer broadly convex apically in lateral view, in caudal view with posteroventral portion narrowed to a short process that is directed mesad but does not attain median line; plates extending posteriorly beyond pygofer apex, each with uniseriate macrosetae; style extending posteriorly beyond apex of connective, narrowed and truncate apically; aedeagus with shaft broadened anteapically, truncate at apex in lateral view, and bearing an acute proximally directed process on each side.

Markings of anterior dorsum and forewings as in *C. truncata,* n. sp. (above) except that scutellum has black dots and vermiculations; face and thoracic pleura sordid green to gray; legs brown, hindleg darkened apically beginning near middle of tibia.

Holotype, Aldeia Yararuhu (Aracu), Igarapé Gurupá-Una, Maranhão, about 50 km east of Canindé, Rio Gurupá, Pará, Brazil, February 11-25, 1966 (Borys Malkin) (CAS).

138. STEPHANOLLA, NEW GENUS

FIGURES 834-837

Type-species: *Tettigonia rufoapicata* Fowler.

Length 6.8-8.8 mm.

Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from one-half to almost two-thirds interocular width and from one-third to more than four-tenths transocular width, with or without a transverse concavity across ocelli (variable intraspecifically): antennal ledges in lateral view with anterior margins rectilinear and slightly oblique, clypeus flattened medially; other head characters as in *Coronigonalia*, new genus (above).

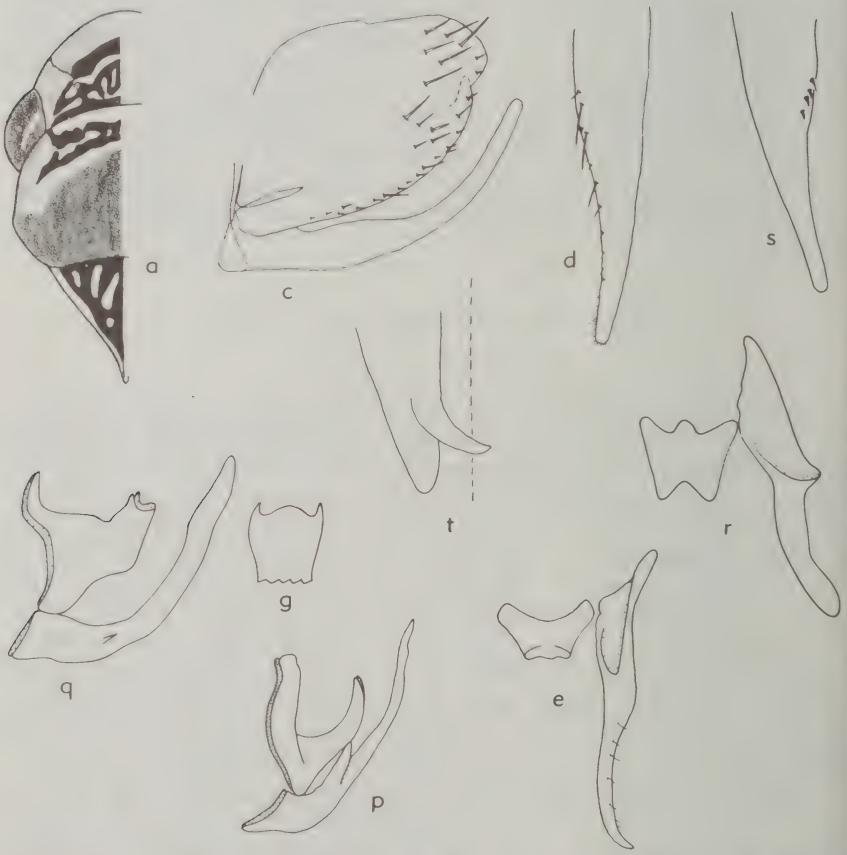


FIGURE 834.—*Stephanolla rufoapicata* (Fowler) (*g*, *q-s*, from lectotype; remainder from specimen from Barro Colorado Island, Panama Canal Zone; only aedeagal apex shown in *g*): *p*, *q*, Aedeagus and paraphyses, from lateral view; *r*, style and connective, from dorsal view; *s*, plate from ventral view; *t*, male pygofer apex, left side, from caudal view.

Thorax with pronotal width less than, or equal to transocular width of head, lateral margins convergent anteriorly, scutellum not transversely striate behind transverse sulcus; other thoracic characters and forewings as in *Coronigonalia*.

Male genitalia: Pygofer moderately produced, with apex bilobate (exception: *S. remota,* n. sp), with macrosetae occurring in a band parallel to and near posterior margin; pygofer process arising near middle of posterior margin or slightly more ventrally on posteroventral margin, extending mesally, or dorsally and mesally and crossing median line. Plates very slender, gradually tapering to narrowly rounded apices, extending posteriorly a variable (interspecifically) distance in relation to pygofer apex, with setae very small, uniseriate or nearly so. Style extending posteriorly beyond apex of connective, rounded apically, without a lobe in basal half of shank. Aedeagus varying interspecifically, usually without processes. Paraphyses asymmetrical or absent, branched or not when present.

Female (unknown in *S. quepelana,* n. sp., and *S. remota,* n. sp.) abdominal sternum VII deeply trilobate at apex, the median lobe broader and more broadly rounded apically than the lateral lobes. Genital chamber with a large median sclerite, oriented vertically in a transverse plane, contiguous with first valvifer on each side. Second valvulae each toothed through most of portion beyond basal curvature, the teeth widely spaced and each bearing numerous secondaries, apex acute and with dorsal anteapical denticles (much as in illustration of *Graphogonalia clypealis,* n. sp., fig. 810*m*). Pygofer acutangular dorsoapically in lateral view, with setae few, arising on apical half.

Species of *Stephanolla,* new genus, have a red to orange band at the margin of the crown, as in *Coronigonalia*.

The range of *Stephanolla* is southern Mexico, Nicaragua, Costa Rica, Panama, and Ecuador. *Stephanolla* is related to *Coronigonalia,* new genus, from which it may be separated readily by the shorter male pygofer with the setae fewer and closer to the apical margin, by the more slender male plates, and by the trilobate abdominal sternum VII of the female, all of which differ from *Coronigonalia*. The male genitalia of *Stephanolla* are very similar to those of *Nielsonia,* new genus, but the styles of *Stephanolla* are more slender and elongate. Females of *Nielsonia* do not have the trilobed abdominal sternum VII.

The present interpretation of *Tettigonia rufoapicata* Fowler is based on a study of the male lectotype.

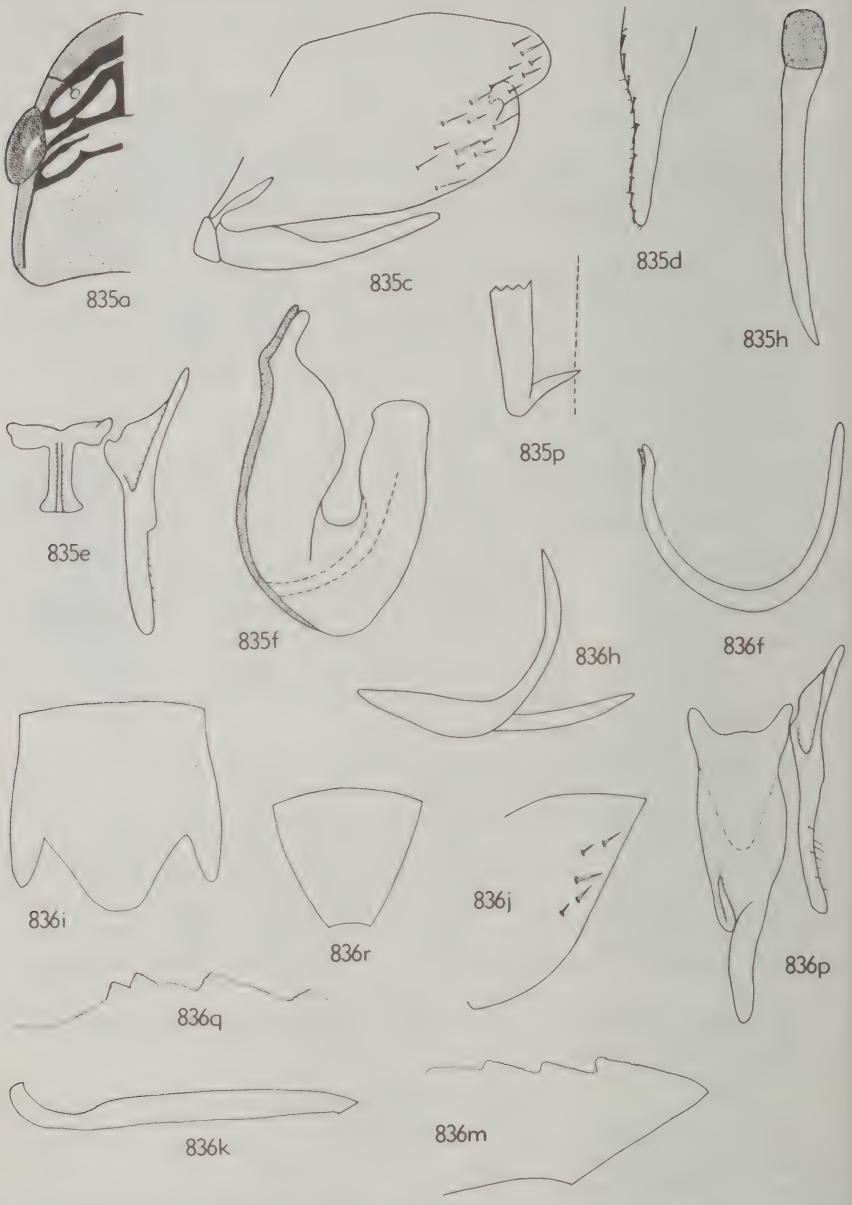
SPECIES OF *STEPHANOLLA*

cazapana, n. sp. Nicaragua, Panama, Colombia.
quepelana, n. sp. S. Mexico, Guatemala.
remota, n sp. Panama, Ecuador.
rufoapicata (Fowler), 1900d:286 (*Tettigonia*). Costa Rica, Panama. New combination.

KEY TO MALES OF *STEPHANOLLA*

1. Plates not extending as far posteriorly as pygofer apex
quepelana, n. sp., page 1027

Plates extending posteriorly as far as pygofer apex 2



FIGURES 835, 836—835, *Stephanolla quepelana,* n. sp., holotype (*h* from dorsal view): *p,* Male pygofer apex, left side, from caudal view. 836, *S. cazapana,* n. sp., (from specimens from Panama; *h* from lateral view): *p,* Style, connective, and paraphyses, from dorsal view; *q,* basalmost teeth of second valvula; *r,* median sclerite of genital chamber.

2. Aedeagus very slender and crescentiform in lateral view
cazapana, n. sp.
Aedeagus not so 3

3. Paraphyses present ..... *rufoapicata* (Fowler) (fig. 834)
Paraphyses absent ..... *remota,* n. sp., page 1029

Stephanolla quepelana, NEW SPECIES

FIGURE 835

Length of male 5.0-5.5 mm. Head with median length of crown varying from six-tenths to two-thirds interocular width and from four-tenths to slightly more than four-tenths transocular width; without a transverse concavity across ocelli. Pronotal width less than transocular width of head. Male with pygofer process arising near middle of posterior margin, extending mesally, plates not extending as far posteriorly as pygofer apex; style with a lobe at midlength of shank; aedeagus broad, narrowly U-shaped in lateral view, without processes; paraphysis unbranched, elongate (slightly less than twice length of style), not occurring in median sagittal plane. Female unknown.

Crown with anterior portion orange with a small black apical spot, remainder olive-green marked with black, with a characteristic inverted V-shaped green mark heavily margined with black before and behind; pronotum green in varied shades, lateral margins banded broadly with orange with inner edges of bands black and with a narrow black transverse band parallel to anterior pronotal margin, connecting the inner black edges on each side; forewing with a broad costal orange band and only partially separated from a similar broad arcuate band through bases of apical cells, with black margins before and behind, remainder of wing dark green with veins black; face pale with a median narrow black line extending through clypeus and most of clypellus, muscle impressions of clypeus pale brown, thoracic pleura with a dark brown proepimeral band beneath dorsopleural carina, legs pale.

Holotype male, Palenque Ruins, Chiapas, Mexico, July 7, 1949 (J. J. Goodnight); one male, Tikal Peten, and one, Petén, Guatemala, both September, 1959 (N. L. H. Krauss) (USNM).

S. quepelana, n. sp., is closely related to *S. rufoapicata* (Fowler), but it differs from all other species in its short male plates which do not extend as far posteriorly as the pygofer apex. *S. cazapana,* n. sp., is also very similar in appearance, but in *quepelana* the orange costal band of the forewing is partially separated from the transverse anteapical band by a short black line which does not occur in *cazapana.*

Stephanolla cazapana, NEW SPECIES

FIGURE 836

Length of male 6.8-7.1 mm, of female 6.8-7.7 mm. Head with median length varying from one-half to two-thirds interocular width and from one-third to slightly more than four-tenths transocular width; without or with only

a weak transverse concavity across ocelli. Pronotal width less than transocular width of head. Male with pygofer process as in *S. quepelana,* n. sp. (above); plates extending posteriorly as far as pygofer apex; style not lobed; aedeagus slender, broadly U-shaped in lateral view, without processes; paraphyses paired, asymmetrical, scarcely distinctly separated basally from connective. Female as in generic description.

Crown marked as in *quepelana,* but with inverted V-shaped mark less pronounced; pronotum blue or variably green, lateral margins banded as in *quepelana* but usually without inner edges of bands black, with a narrow irregular double black band parallel to anterior pronotal margin, with the narrow enclosed area pale and subdivided into several areoles by short black lines between the double bands; forewing marked much as in *quepelana* but with no interruption between the costal and anteapical orange bands, and with veins not black; face as in *quepelana,* but median black line not extending to apex of clypeus in female, and muscle impressions of clypeus occasionally not brown, thoracic pleura with or without dark spot beneath dorsopleural carina, legs pale.

Holotype male, Ft. Davis, Panama Canal Zone, August 28, 1952 (F. S. Blanton); two females and two specimens without abdomen, Mojinga Swamp, Canal Zone, June 17, 1952 (F. S. Blanton) (USNM). Six females, Barro Colorado Island, Panama Canal Zone, May 19, 1967 (D. M. DeLong and C. A. Triplehorn); two males, Santa Fé, Darién Province, Panama, May 25,

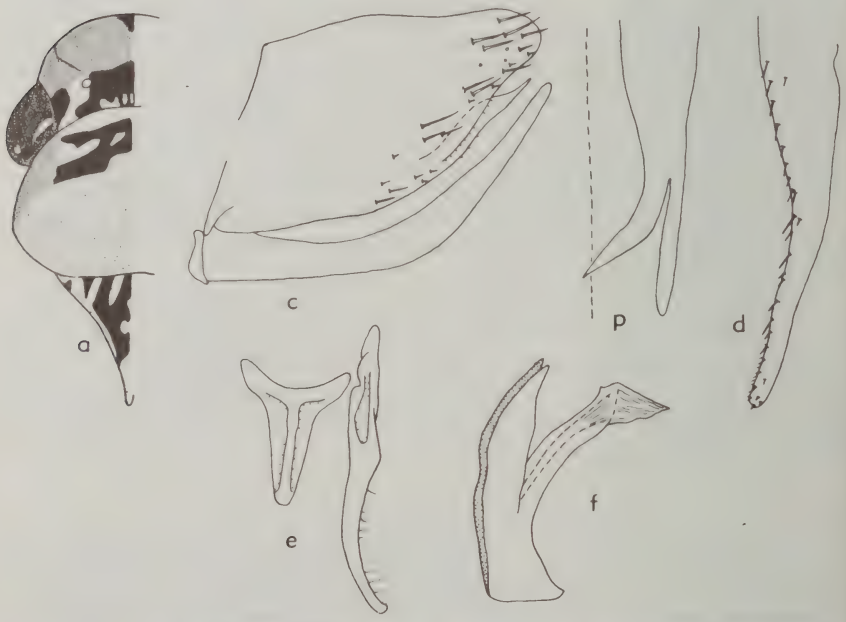


FIGURE 837.—*Stephanolla remota,* n. sp., holotype; *p,* Male pygofer apex, left side, from ventral view.

1967 (same collectors) (OSU). One male, Musawas, Waspuc River, Nicaragua, October 13, 1955 (B. Malkin) (UCAL).

S. cazapana, is similar in appearance to *S. quepelana* in the treatment of which distinguishing characters are discussed.

Stephanolla remota, NEW SPECIES

FIGURE 837

Length of male 8.5-8.8 mm. Head with median length of crown approximately six-tenths interocular width and four-tenths transocular width, with a weak transverse concavity across ocelli. Pronotal width equal to transocular width of head. Male with pygofer process arising below middle of posterior margin, extending dorsomesally; plates extending posteriorly beyond pygofer apex; aedeagus narrowly angulate in lateral view; without processes; paraphyses absent. Female unknown.

Crown with orange anterior portion consisting of at least one-half total coronal surface, with a transverse basal black band partly interrupted by a pair of narrow longitudinal parallel pale lines at middle and with few small additional pale markings; pronotal disk variable green to blue, with a few dark markings near anterior margin, lateral margins broadly bordered with orange; forewing dark green with a narrow costal orange stripe, without a transverse orange anteapical band; propleura and legs orange to sordid yellow, with or without a dark spot on epimeron.

Holotype male, Jaqué, Panama, February, 1943 (P. E. Marucci) (USNM). One male, Pucay, Ecuador, W. Cordillera, 300 m., June 3-26, 1905 (MMB). One male, Quito, Ecuador, 1930 (R. Benoist) (MHNP).

S. remota is larger than the other species of the genus. It is the only species which lacks a transverse anteapical orange band on the forewing, and which lacks paraphyses.

139. FERRARIANA, NEW GENUS

FIGURES 838, 839

Type-species: *Tettigonia trivittata* Signoret.

Length 5.7-7.5 mm.

Head moderately produced with anterior margin narrowly rounded in dorsal view, median length of crown varying from slightly less than six-tenths to three-fourths interocular width and from slightly more than one-third to more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on or before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown with or without a shallow transverse concavity across ocelli, without a median fovea, surface without sculpturing or setae, lateral cylpeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral

view with anterior margins almost vertical and almost rectilinear; clypeus convex or slightly flattened medially, muscle impressions not very distinct, clypellus with contour of its lower portion slightly more nearly horizontal than remainder of profile of face.

Thorax with pronotal width equal to, or less than transocular width of head, lateral margins parallel or slightly convergent anteriorly, dorsopleural

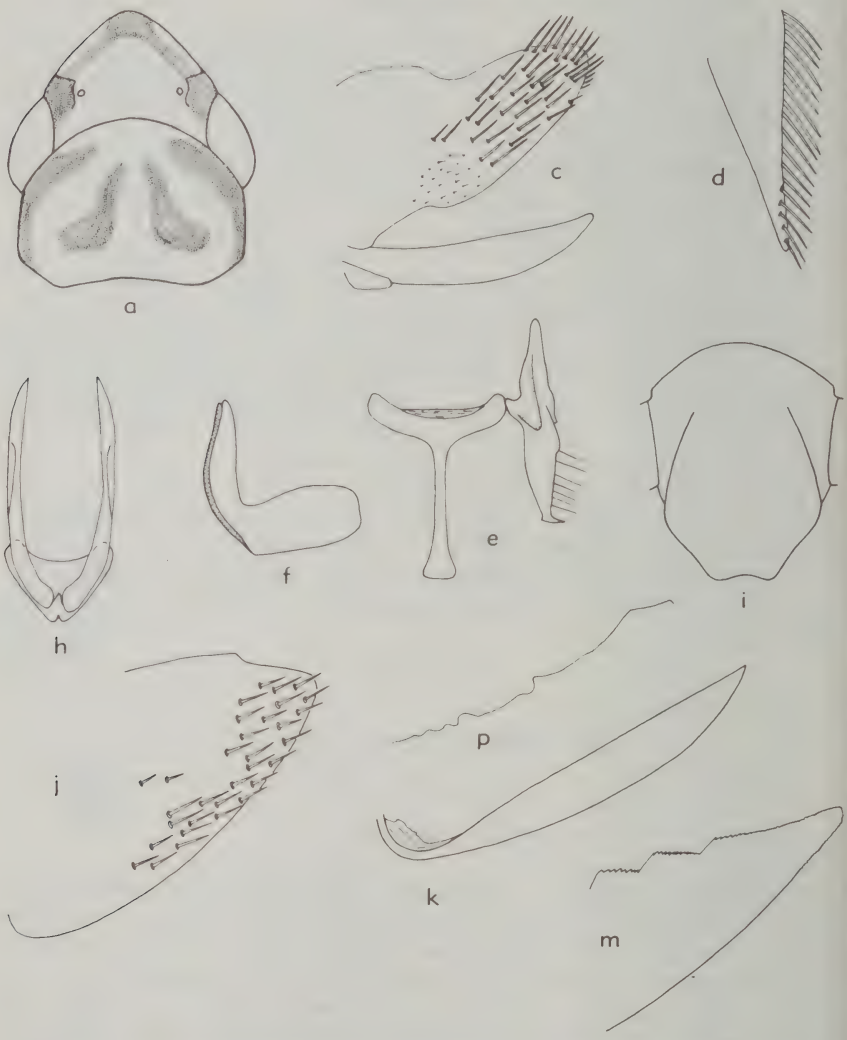


FIGURE 838.—*Ferrariana trivittata* (Signoret) (*a* from specimen from Ancón, Panama Canal Zone; *c-f, h,* from Misiones, Argentina; *i* from lectotype; remainder from Piracicaba, Brazil, *h* from caudoventral view): *p,* Basalmost teeth of second valvula.

carinae complete, posterior margin shallowly concave, disk without sculpturing, not pubescent; scutellum not or only weakly striate behind transverse sulcus. Forewing with membrane including all of apical cells, veins not elevated, not distinct in color from remainder of wing surface, with three anteapical cells of which the bases are proximal to claval apex, middle anteapical cell narrow except at apex, supernumerary crossveins absent; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced posteriorly, narrowly rounded posterodorsally, with numerous discal macrosetae on apical half; pygofer processes absent. Plates slender, tapering gradually, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae. Style not extending posteriorly as far as connective apex, truncate apically. Aedeagus with basal apodemes as long as shaft which extends posterodorsally, processes absent. Paraphyses present, biramous, symmetrical.

Female abdominal sternum VII moderately produced and slightly emarginate at apex; ovipositor with second valvulae broad, each with ventral

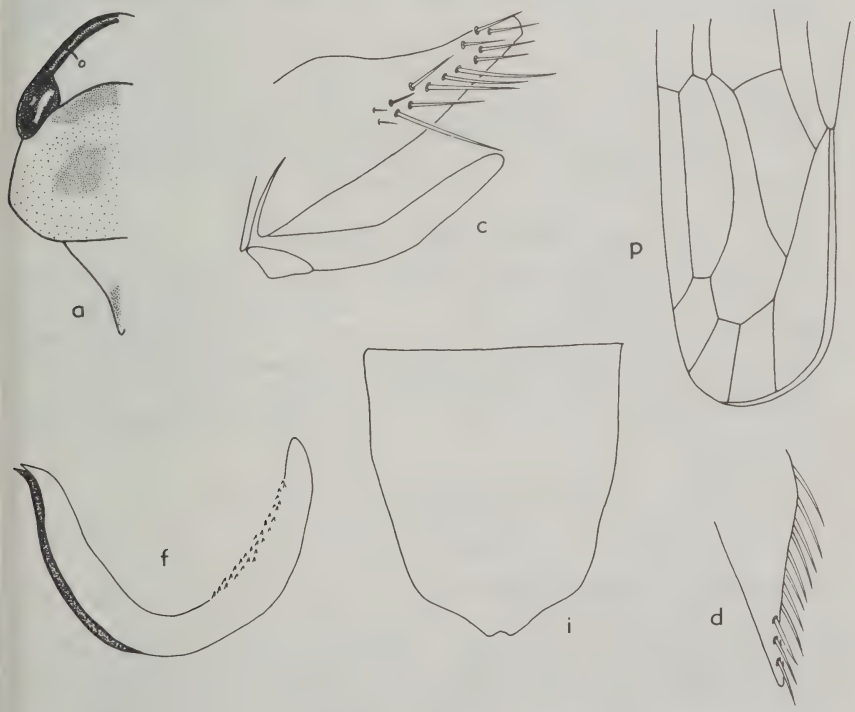


FIGURE 839.—*Ferrariana submarginalis* (Osborn) (from specimens from Santa Cruz, Bolivia): *p*, Apex of forewing.

margin convex, bearing teeth on dorsal margin throughout portion beyond basal curvature, the primaries very broad and bearing secondary teeth.

Ferrariana, new genus, probably occurs from Costa Rica to Argentina and southern Brazil, although I have not yet seen specimens from Ecuador. *Ferrariana* appears to be related to *Graphogonalia*, new genus, but the venation of the forewings and the color pattern of the crown will serve to separate these two genera easily. *Ferrariana* is also close to *Coronigonalia*, new genus, but differs in its lack of pygofer processes in the males, and in its broader second valvulae of the females. Species of *Ferrariana* have a marginal red or orange band on the crown, a feature shared with species in other genera (see discussion of *Coronigonalia* for details), including *Sibovia pileata* (Fowler), but the Fowler species has the second valvulae of the female with the toothed area restricted as in other *Sibovia* species, in contrast to the condition in *Ferrariana*.

I am pleased to name this genus in honor of Pietro Modesto Ferrari, whose work (1882a) demonstrates clearly that he knew the taxonomic worth of the male genitalia of leafhoppers a half century before these structures came into general use by other systematists in Cicadellidae.

Earlier in the course of the present work, I had not yet realized the identity of *Tettigonia trivittata* Signoret, of which I had studied only the female type (Walker's *pallipes* in the British Museum). I returned a number of specimens to various museums with the manuscript name: *Coronigonalia evincta* Young, as a result.

SPECIES OF *FERRARIANA*

submarginalis (Osborn), 1926b:229 (*Graphocephala*). Bolivia, S. Brazil. New combination.
trivittata (Signoret), 1854b:349 (*Tettigonia*) (new name). Costa Rica, Panama, Colombia, Peru, Bolivia, Brazil, Paraguay, Argentina. New combination.
pallipes (Wälker), 1851b:765 (*Tettigonia*) (preoccupied).

KEY TO SPECIES OF *FERRARIANA*

Crown with anterior orange band completely marginal; aedeagus with shaft curved ..... *submarginalis* (Osborn) (fig. 839)

Crown with anterior orange band curved slightly away from margin on each side behind apex, leaving a narrow marginal anterolateral area on each side not covered by the band; aedeagus with shaft straight
trivittata (Signoret) (fig. 838)

140. CUITLANA, NEW GENUS

FIGURES 840, 841

Type-species: *Tettigonia venusta* Stål.

Length 6.7-7.9 mm.

Head moderately produced, median length of crown varying from almost two-thirds to more than eight-tenths interocular width, and from slightly more than four-tenths to slightly less than six-tenths transocular width, without a carina at transition from crown to face, ocelli located on or before a line between anterior eye angles, each ocellus closer to adjacent anterior eye angle

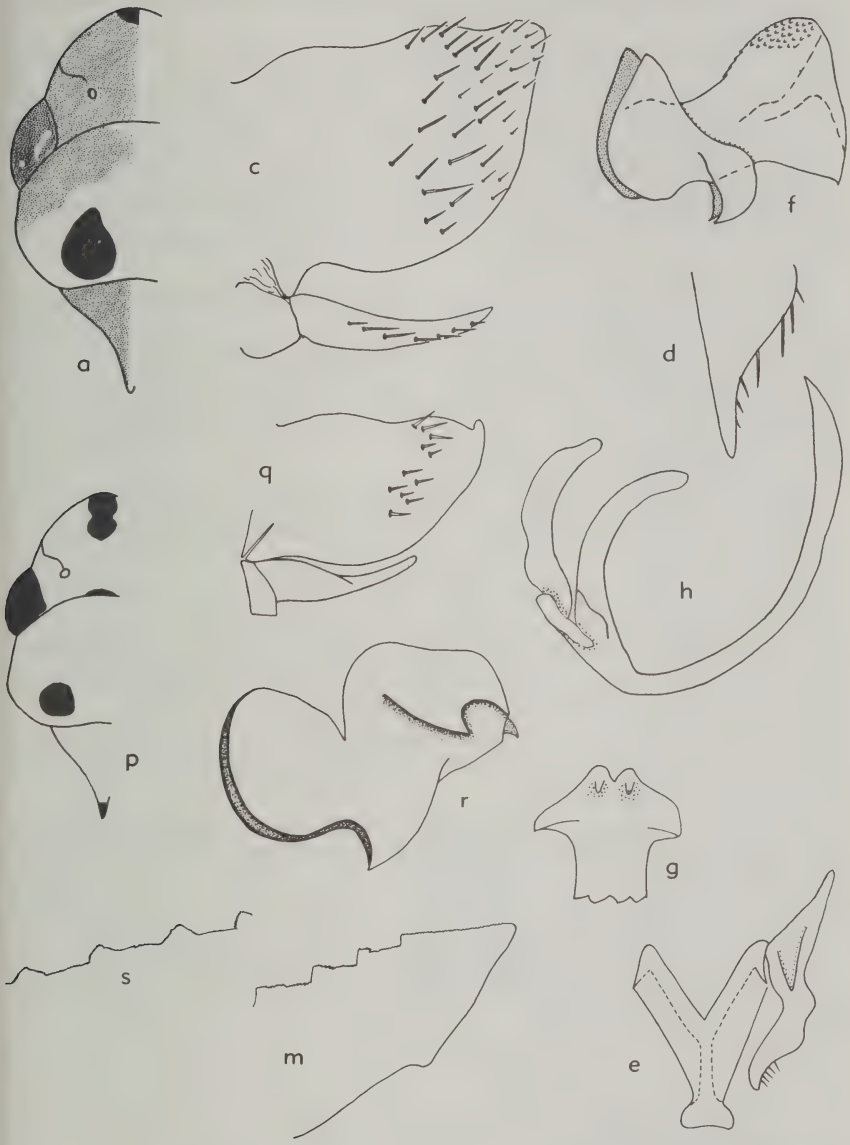


FIGURE 840.—*Cuitlana venusta* (Stål) (*c, d, f, h,* from specimen from Yepocapa, Guatemala; *a* from "MB 287", Mexico; *m, s,* from Jalapa, Vera Cruz, Mexico; remainder (atypical) from Colima, Mexico; only aedeagal apex, from ventral view, shown in *g*; *h* from lateral view): *p,* Anterior dorsum; *q,* male pygofer and plate, from lateral view; *r,* aedeagus from lateral view; *s,* margin of second valvula, near base of toothed portion.

than to median line of crown, crown shallowly concave before ocelli, without a median fovea, usually without punctures, limited to median area when present, setae absent, lateral clypeal sutures extending onto crown and attaining ocelli, attennal ledges not protuberant, in lateral view with anterior margins oblique and usually rectilinear, ledges with weak carinae or none; clypeus convex, muscle impressions not very distinct, face with or without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, transclypeal suture distinct or obscure medially, clypellus continuing profile of clypeus or with its lower portion more nearly horizontal than contour of clypeus.

Male genitalia: Pygofer moderately produced, with apex variable, with or without a short process, setae restricted to apical half. Plates triangular, not extending posteriorly as far as pygofer apex, with uniseriate macrosetae. Style not extending nearly as far posteriorly as apex of connective, narrowly rounded apically, with preapical lobe. Aedeagus symmetrical or nearly so, shaft short, with varying processes (often inconspicuous). Paraphyses elongate, uniramous, not occurring in median plane.

Female abdominal sternum VII moderately produced posteriorly, apex varying from broadly to narrowly convex. Ovipositor with second valvulae each expanded and toothed beyond basal curvature, teeth varying from widely-spaced and triangular at base of toothed portion of valve and quadrate and closer-spaced at apex, to uniformly quadrate throughout toothed portion, apex acute. Pygofer narrowed and acute or narrowly rounded posterodorsally, macrosetae of varying size occurring in apical third and extending some distance anteroventrad parallel to posteroventral margin.

Species of *Cuitlana*, new genus, have the crown and pronotum yellow, marked with spots or lines, and with the forewings usually pink or purplish and partly bordered with black.

I have seen specimens of *Cuitlana* only from Mexico and Guatemala. *Cuitlana* is probably related to *Graphocephala* Van Duzee but differs from it in its slender asymmetrical ramus of the paraphyses in the male, and in the broad aedeagal shaft. The aedeagus is similar to that found in some species of *Apogonalia* Evans, but the forewing venation serves to distinguish these.

There is a considerable amount of variation in the male genitalia of the two forms I have recognized as species, below, and possibly each is a complex, but series available do not warrant conclusions.

SPECIES OF *CUITLANA*

venusta (Stål), 1864a:75 (*Tettigonia*). Mexico, Guatemala. New combination.
verticalis, n. sp. Mexico.

KEY TO SPECIES OF *CUITLANA*

Crown and pronotum with markings in form of black spots
venusta (Stål) (fig. 840)
Crown and pronotum with linear markings ..... *verticalis*, n. sp., page 1036

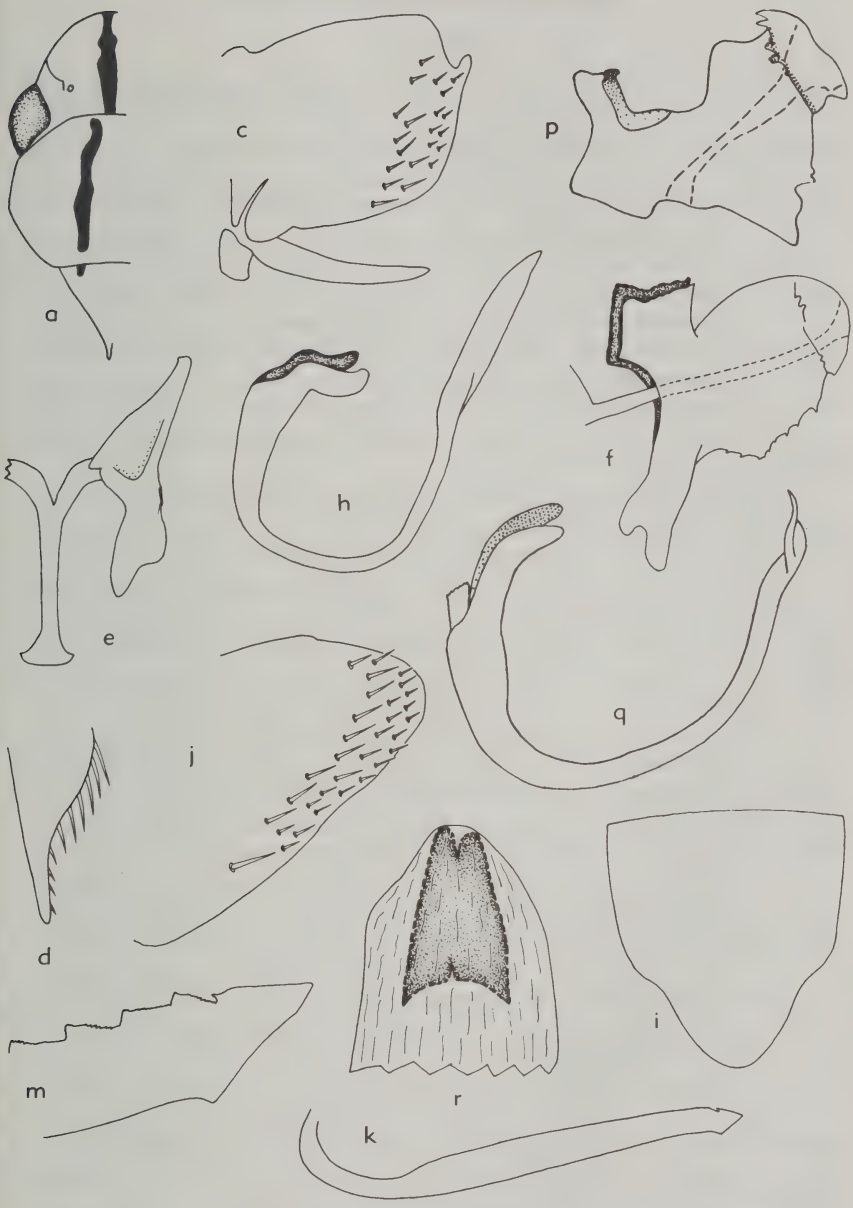


FIGURE 841.—*Cuitlana verticalis*, n. sp. (*a*, *c-f*, *h*, from specimen from Acapulco, Mexico (*f* and *h* are atypical); *p*, *r*, from Morelos, Mexico; remainder from Iguala, Guerrero, Mexico; *h* from lateral view): *p*, Aedeagus (typical) from lateral view; *q*, paraphyses (typical) from lateral view; *r*, genital chamber from ventral view.

Cuitlana verticalis, NEW SPECIES

FIGURE 841

Length 7.2-7.9 mm. Crown with median length varying from seven-tenths to more than eight-tenths interocular width and usually from slightly less than one-half to almost six-tenths transocular width, ocelli located on a line between anterior eye angles, surface finely punctate or not between ocelli; face with or without a slender lenticular sclerite bordering lateral clypeal suture on each side below eye; antennal ledges with or without a weak carina; transclypeal suture obscure medially, clypellus with profile of its lower portion more nearly horizontal than contour of remainder of face. Pronotum with width greater than transocular width of head; forewing with veins not very distinct. Male pygofer with a short undifferentially sclerotized apical process; aedeagus with ventral margin variably produced near base of shaft, somewhat capitate apically; paraphyses with ramus at least slightly biundulate apically. Female with valvulae II of ovipositor bearing primary teeth of almost uniform size throughout length of toothed portion.

Crown, pronotum, and scutellum dull yellow, with a complete median line and lateral line on each side at transition to face, but failing to reach apex of head, a pair of longitudinal pronotal lines, slightly convergent anteriorly but not attaining anterior pronotal margin, a pair of spots on basal scutellar margin opposite posterior ends of pronotal lines, narrow and black, forewing pink, narrowly bordered with black except along appendix and basal portion of humeral margin; proepimeron with a black stripe bordering dorsopleural carina beneath; face, remainder of pleura, venter, and legs, yellow.

Holotype male and two females, Jiutepec, Morelos, September 6, 1939 (DeLong and Plummer); one male, Acapulco, Guerrero, October 24, 1941 (DeLong, Good, Plummer, and Caldwell); one female, Iguala, Guerrero, September 11, 1939 (D. M. DeLong); one male, Iguala, Guerrero, October 25, 1941 (DeLong, Good, Caldwell, and Plummer); one male, Taxco, Guerrero, October 26, 1941 (same collectors); one male and two females, Mexcala, Guerrero, October 2, 1945 (Balock, DeLong, and Hershberger); one male, "Xaltianguis", Guerrero, October 23, 1941 (DeLong, Good, Caldwell and Plummer); two males, Cuernavaca, Morelos, November 20, 1933; two females, Huetamo, Michoacán, August 22, 1933, all from Mexico (DeLong collection, OSU). Three females, Jesús María, Nayarit, Mexico, June 26 (2) and July 27, 1955 (B. Malkin); one female, El Pichón, Nayarit, Mexico, June 25, 1963 (J. Doyen) (UCAL). One female, Tejupilco, Temescaltepec, Mexico, June 17, 1933 (R. L. Usinger) (CAS). One male and one female, Cuernavaca, Morelos, Mexico, 34 mi. S., 2800 feet, August 4, 1954 (J. G. Chillcott); one female, "Taxcoco", Mexico, 7000 feet, August 12, 1954 (J. G. Chillcott) (CNC).

C. verticalis, n. sp., differs from *C. venusta* (Stål) in the characters used in the key, above, in that the paraphysis of the male is somewhat biundulate apically, and in that the primary teeth of valvula II are almost uniform throughout length of the toothed portion.

141. TLAGONALIA, NEW GENUS

FIGURE 842

Type-species: *Tettigonia nigroguttata* Signoret (1855d:772).

Length 8.0-8.8 mm.

Head well produced, median length of crown varying from slightly more than one-half to approximately seven-tenths interocular width, and from slightly more than one-third to more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each ocellus slightly closer to adjacent anterior eye angle than to median line of crown, crown with a transverse concavity across ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, muscle impressions distinct or not, transclypeal suture obscure medially, clypellus with profile of its upper portion continuing contour of clypeus, its lower portion slightly more nearly horizontal.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk of pronotum without sculpturing; scutellum not transversely striate behind transverse sulcus. Forewing with only inner portion of inner apical cell membranous, veins not elevated, not very distinct, with three closed anteapical cells of which base of innermost is opposite claval apex, bases of two outermost more proximal than claval apex, with four apical cells and the base of the fourth obscure, not or only slightly more proximal than base of third, without supernumerary crossveins in anteapical cells; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, apex broadly convex, with a number of macrosetae near posterior and posteroventral margin, mixed with a few small microsetae. Pygofer processes absent. Plates triangular, not extending posteriorly as far as pygofer apex, with macrosetae uniseriate or nearly so. Style extending posteriorly as far as or slightly beyond connective; apex truncate, with an angulate lateral projection. Connective somewhat Y-shaped. Aedeagus symmetrical, basal apodemes long, shaft bisinuate, apex with a slight lateral expansion on each side. Paraphyses short, U-shaped.

Female abdominal sternum VII moderately produced, posterior margin shallowly concave on each side of a small median lobe. Ovipositor with second valvulae each toothed in most of portion beyond basal curvature, the teeth subquadrate, widely spaced near base, much closer near apex, apex dorsal to axis and acute. Pygofer rounded, with macrosetae in a broad diagonal group parallel to posteroventral margin.

Tlagonalia, new genus, is known only from the type-species, *T. nigroguttata* (Signoret) which is pale orange marked with seven black spots anteriorly.

The present identification of *nigroguttata* is based on the original illustration. I have found no specimen eligible to be lectotype.

Specimens of *T. nigroguttata* have been studied from southern Mexico and Guatemala. *Tlagonalia* is similar to *Graphogonalia*, new genus, in the forewing and the second valvula of the ovipositor. Males are similar, in the aedeagus and paraphyses, to *G. vicina*, n. sp.

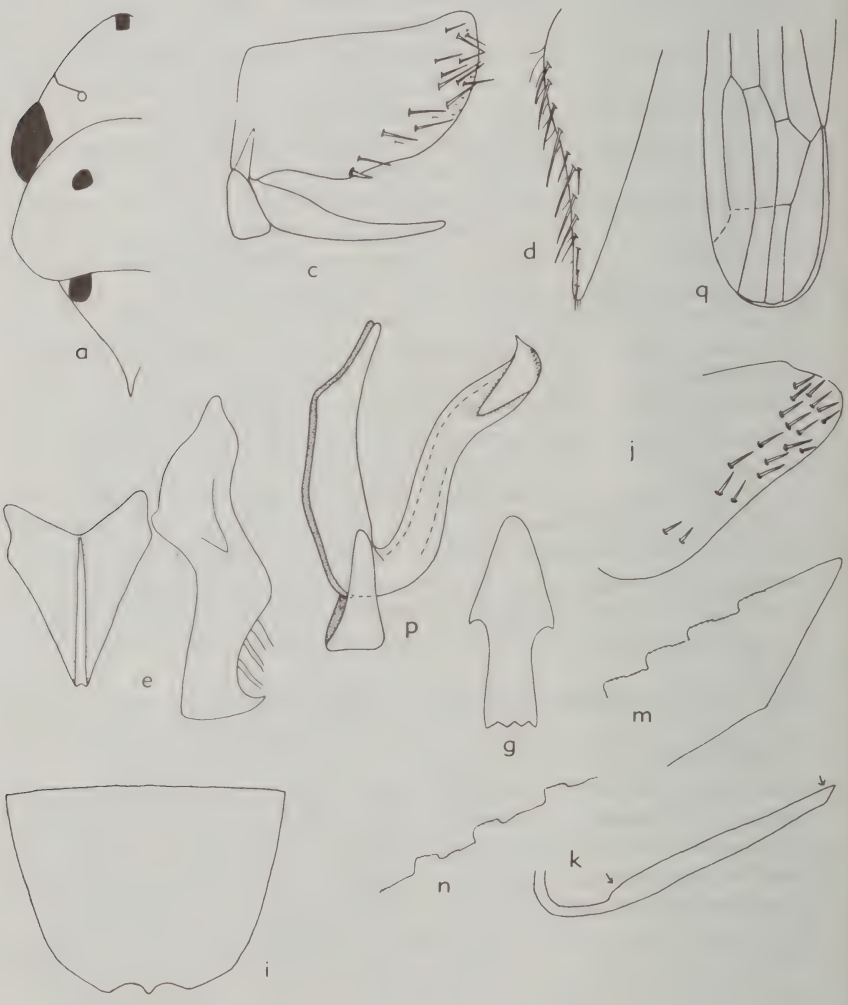


FIGURE 842.—*Tlagonalia nigroguttata* (Signoret) (*i-k, m, n, q,* from specimens from Chiapas, Mexico; remainder from Jalapa, Vera Cruz, Mexico; only apex of aedeagus shown in *g;* arrows indicate extremities of toothed portion in *k*): *p,* Aedeagus and paraphyses, from lateral view; *q,* apex of forewing.

142. CALDWELLIOLA, NEW GENUS

FIGURES 843-850

Type-species: *Tettigonia reservata* Fowler.

Length 5.2-6.9 mm.

Head moderately produced, median length of crown varying from slightly less than six-tenths to more than three-fourths interocular width and from slightly less than one-third to almost one-half transocular width, anterior margin broadly rounded in dorsal view, margin not angular at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles, varying interspecifically in relation to distance from latter and from median line of crown, surface with a transverse concavity before ocelli and with a shallow median concavity, without sculpturing, lateral clypeal sutures extending onto crown, but seldom attaining ocelli (variable intraspecifically); antennal ledges not protuberant, with anterior margins oblique and convex in lateral view; face in profile with clypeus slightly flattened, muscle impressions not very distinct, clypellus with contour of its lower portion slightly more nearly horizontal than profile of remainder of face, transclypeal suture obsolete medially.

Pronotum with width less than transocular width of head, lateral margins usually parallel (convergent in *C. solimoeana*, n. sp.); dorsopleural carinae complete, disk smooth, without pubescence; scutellum without transverse rugae on its posterior portion. Forewing with membrane including all of apical cells except basal portion of outermost and extending basad a short distance along costal margin (exception: *C. lutea* (Signoret) in which it is not distinct), veins distinct, with three closed anteapical cells of which bases of inner and outer cells are almost in a transverse line with claval apex, base of middle anteapical cell more proximal, with four apical cells and base of fourth usually located more proximally than base of third, without an anteapical plexus of veins, texture coriaceous except for membrane described above; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; first tarsomere with length slightly greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced posteriorly, posterior margin varying from narrowly to broadly convex, macrosetae variable interspecifically, occurring on posterior half of disk, without pygofer processes. Plates separate throughout their length, extending almost as far posteriorly as pygofer apex, each slender, triangular and with uniseriate macrosetae. Style extending posteriorly to a variable (interspecifically) degree, without preapical lobe, apex truncate or narrowly rounded. Connective broadly Y-shaped or triangular. Aedeagus symmetrical, with elongate basal apodemes, without processes. Paraphyses present, asymmetrical, appearing contorted, stalked basally.

Female abdominal sternum VII with posterior margin produced and angular or subangulate. Genital chamber without sclerites. Ovipositor with second valvulae each broadened beyond basal curvature and bearing quadrate

teeth, apex paraboloid. Pygofer with macrosetae on posterior half and extending slightly anteroventrally near pygofer margin.

Most species of *Caldwelliola* are dull green except for the tan to yellow head, anterior portion of the pronotum, and the scutellum (exception: *C. lutea* (Signoret) which is entirely pale yellow). The crown usually bears some brown or black markings.

Caldwelliola, new genus, occurs from Central America, Trinidad and Tobago Islands in the West Indies, and from Venezuela and Colombia to Bolivia. Most species of *Caldwelliola* are similar in appearance to *Chlorogonalia ultima*, n. sp., and superficially to *Crossogonalia hectica* (Signoret). Males of *Chlorogonalia*, new genus, have greatly reduced sternal abdominal apodemes in contrast to *Caldwelliola*; and males of *Crossogonalia* species have long, fine setae on the male plates, in addition to symmetrical paraphyses, in contrast to *Caldwelliola*. The true relationship of *Caldwelliola* to other genera is problematical. I have placed it near *Borogonalia*, new genus, because of the similarity of the male genitalia in the two genera. The lobate aedeagal apex of *Borogonalia* and the uniseriate macrosetae of the plates of *Caldwelliola* serve to separate them.

Caldwelliola andamira, n. sp., has been collected on *Vernonia* sp. in Venezuela; *C. caucana*, n. sp., on Soya in Colombia.

I have not seen typical specimens of *Tettigonia lutea* Signoret. My identification of this species is based on the original description and Fowler's illustration.

My interpretation of *Tettigonia reservata* Fowler is based on specimens compared with the original illustration of that species. The anterior dorsum of *reservata* is like that described for *C. caucana*, n. sp., but there are no black spots on the scutellum.

Caldwelliola, new genus, is named in recognition of the progress achieved by Dr. John S. Caldwell in the development of our knowledge of the auchenorrhynchous fauna of the tropics of the New World.

SPECIES OF *CALDWELLIOLA*

andamira, n. sp. Venezuela.
caucana, n. sp. Colombia.
cunahua, n. sp. Peru.
insularis, n. sp. Venezuela, Trinidad Island, Tobago Island.
lutea (Signoret), 1855d:773 (*Tettigonia*). Mexico, Guatemala, El Salvador, Costa Rica. New combination.
reservata (Fowler), 1900b:267 (*Tettigonia*). Honduras, Br. Honduras, Costa Rica, Panama. New combination.
selvola, n. sp. Peru.
solimoeana, n. sp. Peru, SW. Brazil.

KEY TO MALES OF *CALDWELLIOLA*

1. Crown of head with a conspicuous median discal black spot; aedeagus broadest at midlength 2
   Crown without a discal black spot; aedeagus not broader at midlength than more basally or more apically 4

2. Sternal abdominal apodemes very slender, not capitate, extending posteriorly beyond second conjunctiva behind their origin (Central America) ..... *reservata* (Fowler) (fig. 843)
   Sternal apodemes not extending as far posteriorly, capitate or not (West Indies and northern S. America) 3

3. Sternal abdominal apodemes capitate (female abdominal sternum VII without posterolateral convexities) ..... *insularis*, n. sp.
   Sternal abdominal apodemes not capitate, attaining second conjunctiva behind origin (female abdominal sternum VII with a posterolateral convexity on each side) ..... *caucana*, n. sp., page 1043

4. Sternal abdominal apodemes longer than wide 5
   Sternal abdominal apodemes wider than long 6

5. Length more than 6.0 mm; with a median black spot near midlength of pronotum and a pair of black spots at base of scutellum *lutea* (Signoret) (fig. 846)
   Length less than 5.5 mm; without black spots on pronotum or scutellum *andamira*, n. sp., page 1044

6. Pygofer subacute at apex 7
   Pygofer rounded at apex ..... *selvola*, n. sp., page 1046

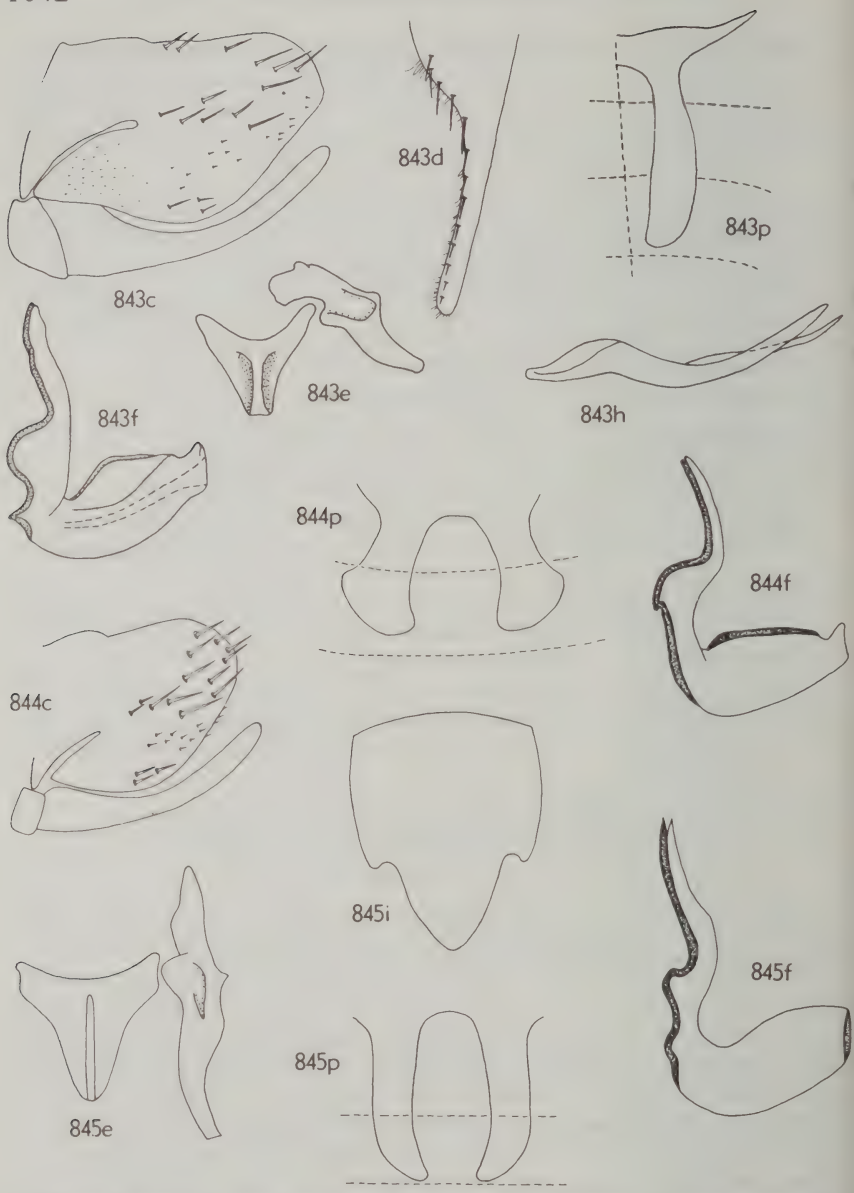
7. Posteroventral pygofer margin concave; head with a black spot at apex *cunahua*, n. sp., page 1046
   Posteroventral pygofer margin convex; head without a black spot at apex *solimoeana*, n. sp., page 1048

Caldwelliola insularis, NEW SPECIES

FIGURE 844, PAGE 1042

Length of male 5.6-5.7 mm, of female 6.4-6.7 mm. Head with median length of crown varying from slightly more than three-fourths to more than eight-tenths interocular width, and between four- and five-tenths transocular width, ocelli located behind a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown. Pronotum with lateral margins parallel. Male pygofer broadly convex apically, with a larger group of large macrosetae on upper portion of posterior half of disk, a small group of macrosetae near ventral pygofer margin, and a number of minute setae between the groups; style extending posteriorly beyond apex of connective, apex truncate; connective broadly Y-shaped; aedeagus with shaft either constricted anteapically on dorsal margin and with portion beyond constriction truncate (type), or narrowed at apex. Sternal abdominal apodemes inflated apically, extending well beyond conjunctiva behind their origin. Female abdominal sternum VII with posterior margin produced and obtusely angular at apex and without a distinctly delimited convex posterolateral lobe on each side.

Crown, anterior portion of pronotum, and scutellum, sordid yellow, with a black spot at apex of head and another on disk of crown; forewings and



FIGURES 843-845.—843, *Caldwelliola reservata* (Fowler) (from specimen from Concepción, Panama: *h* from lateral view): *p*, Sternal apodemes of male abdominal segment II (transverse broken lines represent conjunctivae). 844, *C. insularis*, n. sp., holotype: *p*, Sternal apodemes of male abdominal segment II (transverse broken lines represent conjunctivae). 845, *C. caucana*, n. sp. (*i* from specimen from Palmira, Colombia; remainder from holotype): *p*, Sternal apodemes of male abdominal segment II (transverse broken lines represent conjunctivae).

posterior portion of pronotum dark green; face, thoracic pleura, venter, and legs, yellow.

Holotype and three additional males, Port of Spain, Trinidad, Department of Agriculture grounds, November 3, 1918 (Harold Morrison); one female, "River Estate", Trinidad, October 16, 1918 (Harold Morrison); one male, St. Augustine, Trinidad, B. W. I., February, 1943 (Fennah); six males and five females, Archibald Estate, Roxborough, Tobago Island, November 6, 1918 (Harold Morrison); one male and two females, Santa Elena de Uairén, Venezuela, October 20, 1940 (P Anduze); and one female, same data as last preceding except date which is November 22-30, 1939 (all USNM).

Caldwelliola insularis is close to *C. reservata* (Fowler) and *C. caucana*, n. sp., from both of which it differs in lacking the paired pronotal spots. The apically expanded sternal abdominal apodemes of the males of *insularis* are different from both of these other species and the posterolateral lobes of the female sternum VII, well developed in *caucana*, are very indistinct or completely absent in *insularis*. The aedeagus apparently varies intraspecifically in the form of the apex, and is probably not reliable for separating *insularis* and *caucana*.

Caldwelliola caucana, NEW SPECIES

FIGURE 845, PAGE 1042

Length of male 5.9-6.7 mm, of female 6.5-6.9 mm. Head with median length of crown varying from slightly less than two-thirds to approximately eight-tenths interocular width, and from slightly more than one-third to slightly more than four-tenths transocular width, ocelli located behind a line between anterior eye angles, each approximately equidistant from adjacent anterior eye angle and median line of crown. Pronotum with lateral margins parallel. Male genitalia as in *C. insularis*, n. sp. (above), except that the aedeagus is usually not constricted anteapically (see comments below); apex truncate. Sternal abdominal apodemes extending well beyond next conjunctiva behind their origin, not expanded apically. Female abdominal sternum VII with posterior margin produced medially but less angulate at apex than *insularis* and with a distinct small posterolateral lobe on each side.

Color and markings as in *insularis* but in addition with a pair of small black spots on anterior half of disk of pronotum, and a black spot in each basal angle of scutellum, the latter often concealed by overlying pronotum; face, thoracic pleura, venter, and legs, yellow.

Holotype and two additional males and three females, Popayán, Colombia, 1760 m., April 15, 1948 (Pfaff) (USNM). Three males and one female, Palmira, Valle, Colombia, August 29, 1956 (C. Carmona) on Soya; one male and one female, same locality as last, August 9, 1955 (M. Benavides) on Soya.

C. caucana, n. sp., is similar to *C. insularis*, n. sp., in the discussion of which distinguishing characters are set forth. The Colombian males dissected each had the aedeagus like figure 845*f*. A male from Ecuador, very close to the above, had an aedeagus like *C. reservata* (Fowler) and the aedeagus illustrated for *insularis* (fig. 844*f*). The markings were like typical *caucana*.

Caldwelliola andamira, NEW SPECIES

FIGURE 847

Length of male 5.2-5.3 mm, of female 5.7-6.3 mm. Head with median length of crown varying from slightly less than six-tenths to slightly more than three-fourths interocular width and from slightly less than four-tenths to almost one-half transocular width, ocelli located on or behind a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown. Pronotum with lateral margins parallel. Male pygofer as in *C. insularis*, n. sp.; style extending posteriorly approximately as far as apex of connective, apex narrowly rounded; connective broadly Y-shaped; aedeagus in lateral view with shaft distinctly narrower than in *insularis* or *caucana*, apex subtruncate or weakly bilobed. Sternal abdominal apodemes attaining first conjunctiva behind their origin. Female abdominal sternum VII with posterior margin produced and obtusely angular medially, without posterolateral lobes.

Crown, anterior portion of pronotum, and scutellum, dull yellow to tan, crown with median line, an arc on each side and an arc extending from a

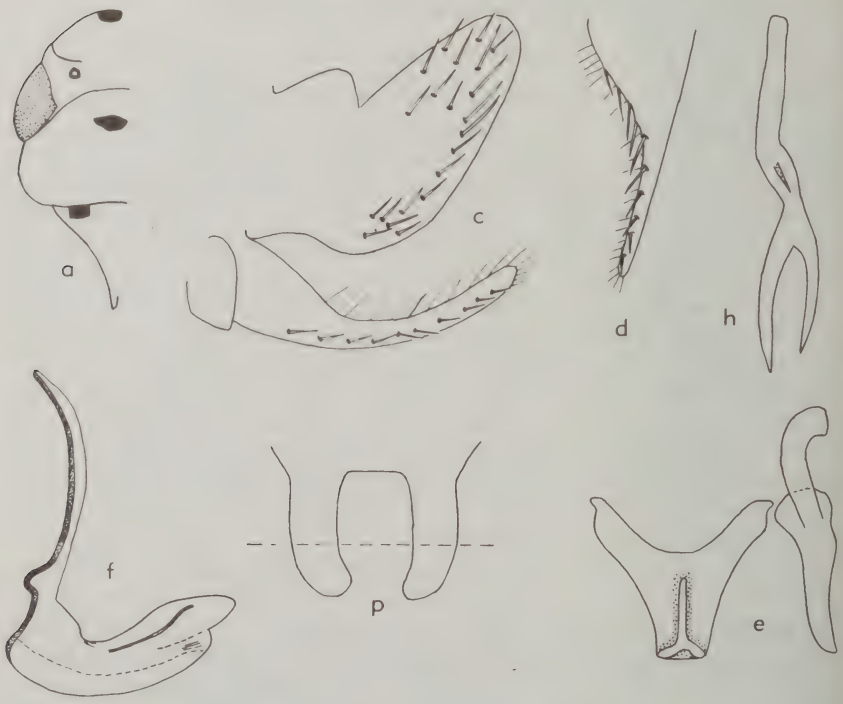


FIGURE 846.—*Caldwelliola lutea* (Signoret) (*a* from specimen from Fortín, Vera Cruz, Mexico; *f* from Yepocapa, Guatemala; remainder from Jalapa, Vera Cruz, Mexico; *h* from ventral view): *p*, Sternal apodemes of abdominal segment II (transverse broken line represents conjunctiva).

point before ocellus towards apex on each side, brown to black, all of these markings narrow, apex with a conspicuous black spot, remainder of pronotum and forewings green, beneath as in *insularis*.

Holotype and fourteen additional males and fourteen females, "Km. 20" Petare-Sta. Lucía, Venezuela, on *Vernonia* sp., April 13, 1939 (C. H. Ballou); two males and one female, El Valle, D. F., Venezuela (G. Vivas-Berthier);

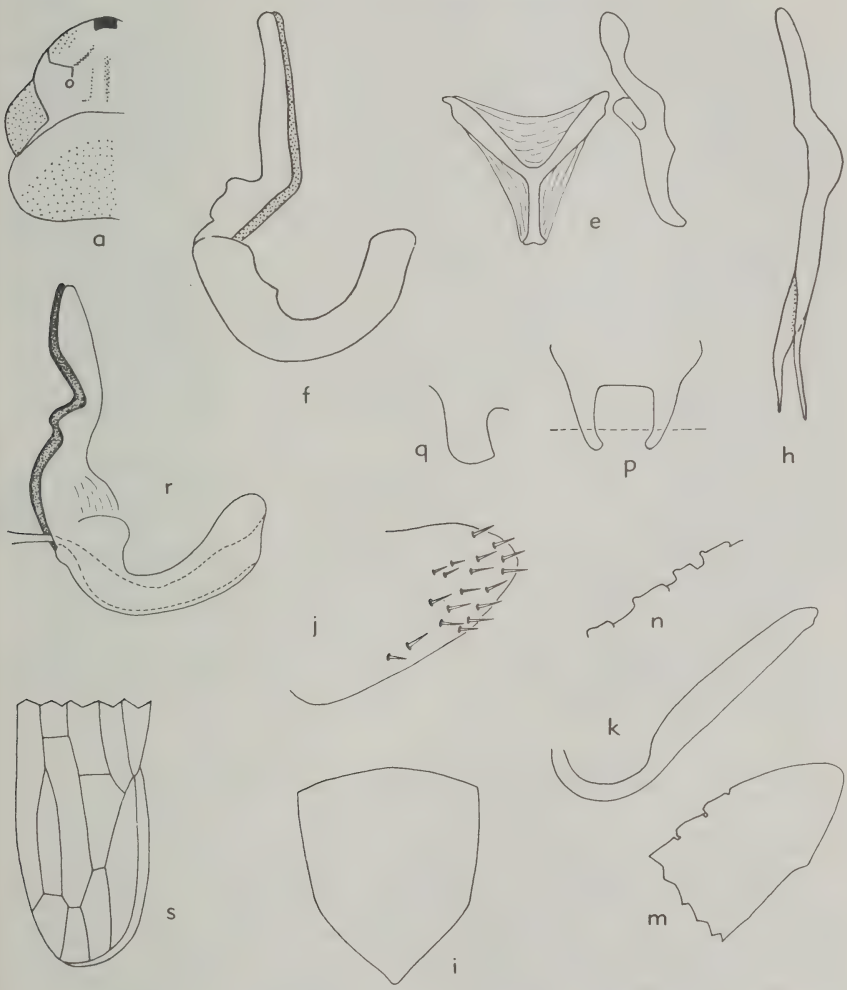


FIGURE 847.—*Caldwelliola andamira*, n. sp. (*m* from holotype; *s* from topotype; *i-k, m, n,* from Santa Lucía, Venezuela; remainder from Distrito Federal, Venezuela; *h* from ventral view): *p,* Sternal apodemes of abdominal segment II (transverse broken line represents conjunctiva); *q,* left apodeme of preceding, from lateroventral view; *r,* aedeagus from lateral view; *s,* forewing apex.

and one female, same locality as preceding, June 15, 1938 (V. R. Moreno), on *Helianthus annus* L. (USNM).

The markings of the crown and the form of the sternal abdominal apodemes serve to separate *C. andamira* from other species in the genus.

Caldwelliola selvola, NEW SPECIES

FIGURE 848, PAGE 1047

Length of male 6.4 mm. Head with median length of crown slightly less than six-tenths interocular width and slightly more than one-third transocular width, ocelli located behind a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown. Pronotum with lateral margins parallel. Male pygofer narrowly convex dorsoapically, with a sparse group of macrosetae parallel to posterior margin, without setae corresponding to the more ventral group of macrosetae described in *C. insularis*, n. sp. (above); style extending posteriorly beyond apex of connective, apex truncate; connective broadly triangular; aedeagus in lateral view with shaft uniformly narrow throughout length. Sternal abdominal apodemes very short, very broad, slightly emarginate apically. Female abdominal sternum VII keeled medially on posterior one-half, with posterior margin produced and obtusangulate, with a slight posterolateral convexity on each side.

Crown, anterior portion of pronotum, and entire scutellum yellow, with a small spot at apex of crown and a spot high on ocellocular area touching lateral clypeal suture on each side, an arcuate line from last extending towards apical spot, and median line narrowly, black; forewings and posterior portion of pronotum dull green, face, thoracic pleura, venter, and legs, yellow.

Holotype male and one female, Callanga, Peru (USNM).

C. selvola, n. sp., is closer to *C. cunahua*, n. sp. (below) than to other species of the genus. It differs markedly in its shorter head and in the less acute pygofer apex of the male.

Caldwelliola cunahua, NEW SPECIES

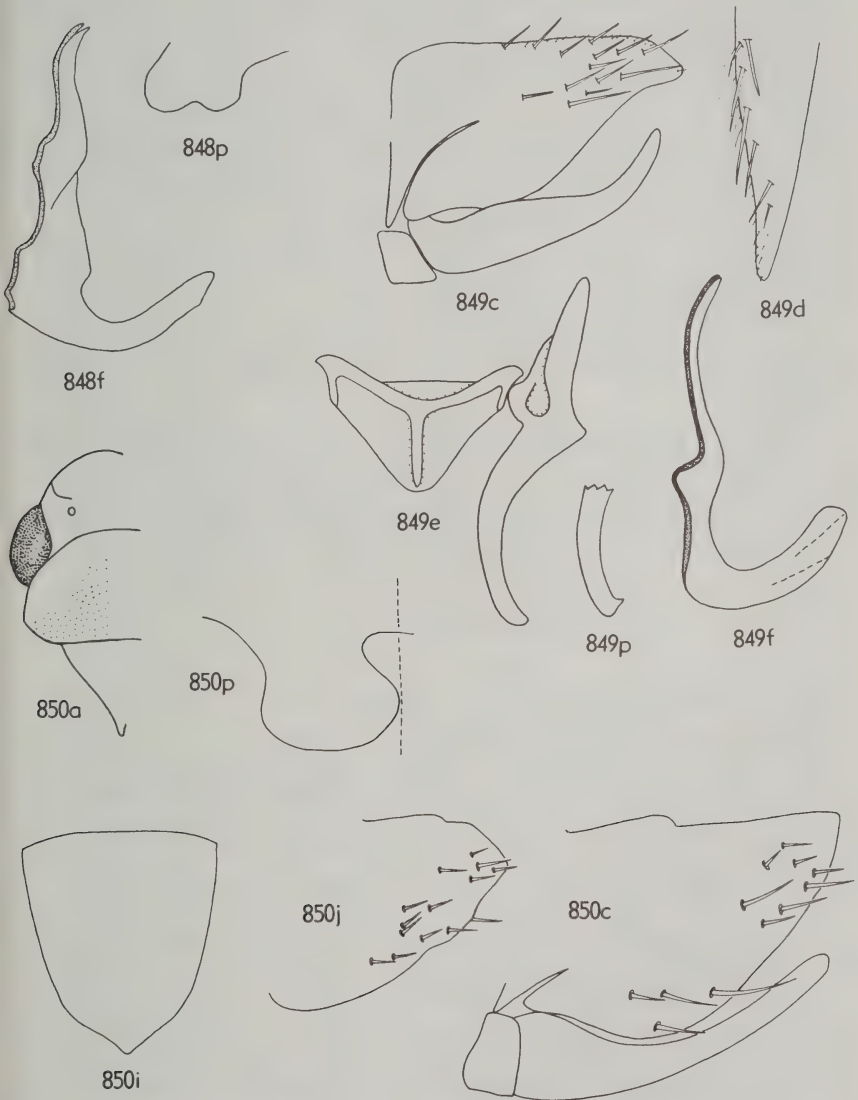
FIGURE 849, PAGE 1047

Length of male 6.3 mm. Head with median length of crown slightly less than three-fourths interocular width and approximately four-tenths transocular width, ocelli located behind a line between anterior eye angles, each equidistant from adjacent anterior eye angle and median line of crown. Pronotum with lateral margins parallel. Male pygofer acute apically, with a group of macrosetae on upper portion of apical half of disk, but without lower group of setae as in some of other species in genus; style extending posteriorly beyond apex of connective; connective short and broadly triangular; aedeagus much as in *C. selvola*, n. sp.; sternal abdominal apodemes very short and broad, less concave apically than *selvola*. Female unknown.

Color as in *selvola*, except that the only markings of the crown are the apical black spot and the black spot on each ocellocular area.

Holotype male, Tingo María, Peru, August 15, 1960 (Oswaldo Vargas) on indefinite loan to USNM from NCS.

C. cunahua, n. sp., is similar to *C. selvola*, n. sp., from which it may be distinguished by the characters cited in the description of the latter.



FIGURES 848-850.—848, *Caldwelliola selvola,* n. sp., holotype: *p,* Left apodeme of abdominal sternum II. 849, *C. cunahua,* n. sp., holotype: *p,* Style apex, from lateral view. 850, *C. solimoeana,* n. sp. (*i* from topotype, remainder from holotype): *p,* Left apodeme of abdominal sternum II.

Caldwelliola solimoeana, NEW SPECIES

FIGURE 850, PAGE 1047

Length of male 6.1 mm, of female 5.9 mm. Head with median length of crown from approximately six-tenths to three-fourths interocular width, and approximately four-tenths transocular width, ocelli located behind a line between anterior eye angles, each slightly closer to adjacent anterior eye angle than to median line of crown. Pronotum with lateral margins slightly convergent anteriorly. Male pygofer angulate posterodorsally, with setae as described above for *C. insularis*, n. sp.; aedeagus, style, and connective as in *C. andamira*, n. sp. Sternal abdominal apodemes very broad apically, not attaining next conjunctiva behind their origin. Female abdominal sternum VII and ovipositor much as in *andamira* (fig. 847) but with primary teeth of valvulae II more closely spaced on basal portion of toothed area.

Crown, anterior portion of pronotum, and scutellum bright yellow, crown unmarked, posterior portion of pronotum and forewings deep green; face, thoracic pleura, venter, and legs, yellow.

Holotype and one additional male and one female, Iquitos, Peru, August, 1960 (Young and Gonzalez) (NCS). Holotype on indefinite loan to USNM from NCS.

C. solimoeana, n. sp., is near *C. andamira*, n. sp., but specimens are readily separated from the latter by the lack of markings on the crown, the more angulate pygofer of the male and by its broader sternal abdominal apodemes.

Since the above description was written, I have identified two specimens from Porto Velho in southwestern Brazil (DeLong collection).

143. BOROGONALIA, NEW GENUS

FIGURES 851-854

Type-species: *Tettigonia impressifrons* Signoret.

Length of male 4.4-5.7 mm, of female 5.3-6.8 mm.

Head not strongly produced, with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly more than one-half to slightly less than seven-tenths interocular width, and from slightly less than three-tenths to slightly more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on or behind a line between anterior eye angles, ocelli varying in relative distance from median line of crown and adjacent anterior eye angle, crown with a transverse concavity before ocelli and with a median concave area extending from it to posterior margin of head, surface of disk without sculpturing or setae, lateral clypeal sutures extending onto crown, and transversely on crown towards each other, each usually without an obvious branch that attains respective ocellus; antennal ledges not protuberant, in lateral view with anterior margins oblique and either rectilinear or (more commonly) convex; face without a vertical lenticular sclerite bordering lateral clypeal suture below each eye, clypeus slightly convex medially, muscle impressions not very distinct, but often

marked with black, transclypeal suture obsolete at middle, clypellus not produced, its contour continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae complete, disk not or very obscurely sculptured, not pubescent; scutellum not transversely striate behind transverse sulcus. Forewing with membrane present, usually not sharply delimited basally (in some specimens basal portions of apical cells 2, 3, and 4 are opaque), inner apical cell always membranous, veins not elevated, not very distinct, with three closed anteapical cells, the bases of all of which are proximal to a line drawn across the wing at claval apex, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced and convex posterodorsally, with a number of macrosetae of varying sizes on apical one-third and extending anteroventrally on and near posteroventral margin, with a number of microsetae located anteroventrally, pygofer processes absent. Plates triangular, their posterior extent varying interspecifically, with numerous fine elongate microsetae and with macrosetae present or absent (variable interspecifically), not uniseriate when present. Style slender, extending posteriorly beyond apex of connective, slightly curved and truncate apically, without preapical lobe. Aedeagus with shaft short, four-lobed apically, without processes, dorsal apodemes variable. Paraphyses slightly variable intraspecifically but always consisting of an elongate slender base, furcate in apical half, the branches variable in length, the entire structure usually asymmetrical both in shape and in that it is not median in location (exception: *B. cruciatula* (Breddin) in which it is median and symmetrical).

Female abdominal sternum VII moderately to considerably elongate with posterior margin produced medially, the apex angular, rounded, or slightly emarginate. Genital chamber without sclerites. Ovipositor with second valvula having toothed portion variable interspecifically in extent, bearing broad dorsal quadrate teeth each with a number of minute secondaries; apex acute and with numerous posterodorsal and posteroventral anteapical denticles. Pygofer moderately produced, rounded apically, with macrosetae on posterior half.

Species of *Borogonalia* are greenish yellow on crown, pronotum (except disk), scutellum, and face, with the forewing and pronotal disk darker green. The crown, scutellum, and often the face, are marked with black.

Specimens of *Borogonalia*, new genus, have been studied from Venezuela, Colombia, Ecuador, Peru, Bolivia, southeastern Brazil, and northern Argentina. This genus is very similar in external appearance to *Tortigonalia*, new genus. The two genera are readily separable by the long fine setae of the male plates, and the absence of drastic modifications of the style apices in *Borogonalia*. Paraphyses are median and vestigial in *Tortigonalia*, usually well-developed and asymmetrical in *Borogonalia* (exception: *cruciatula*). The male genitalia are similar to those of *Caldwelliola*, new genus, except as pointed out in the treatment of the latter.

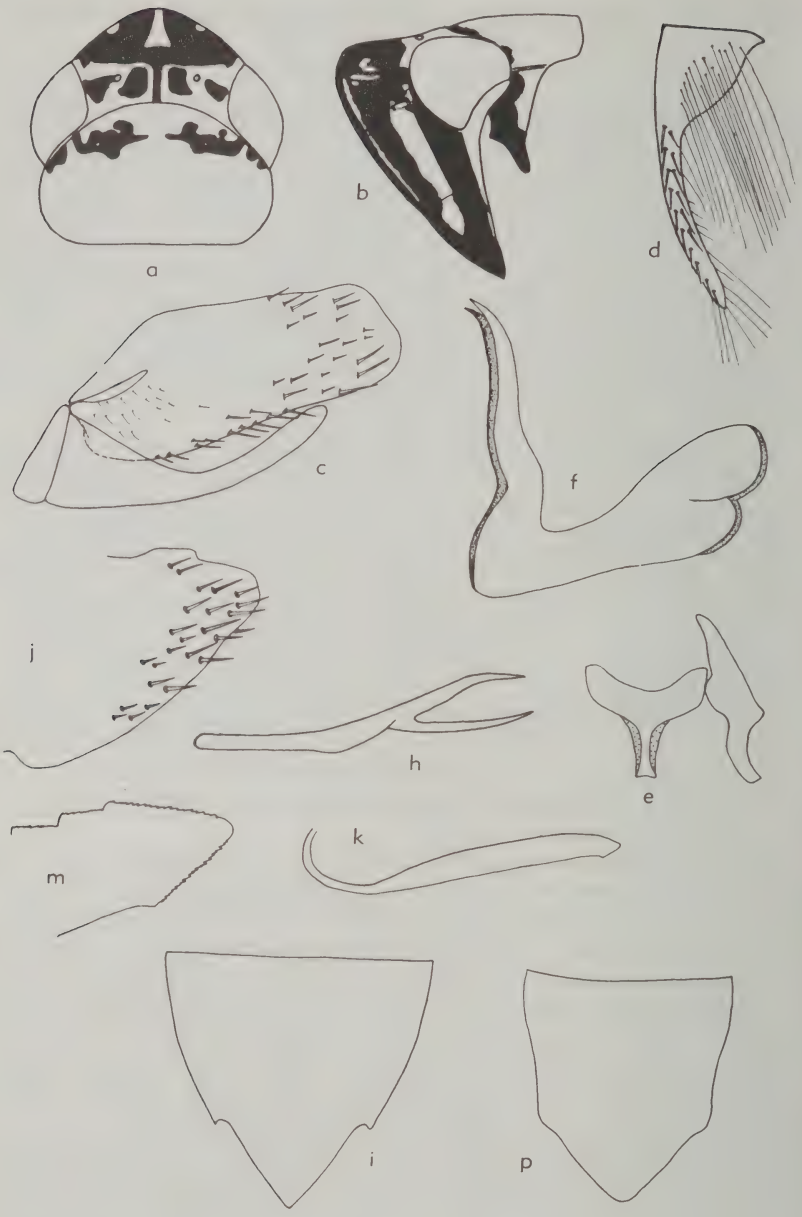
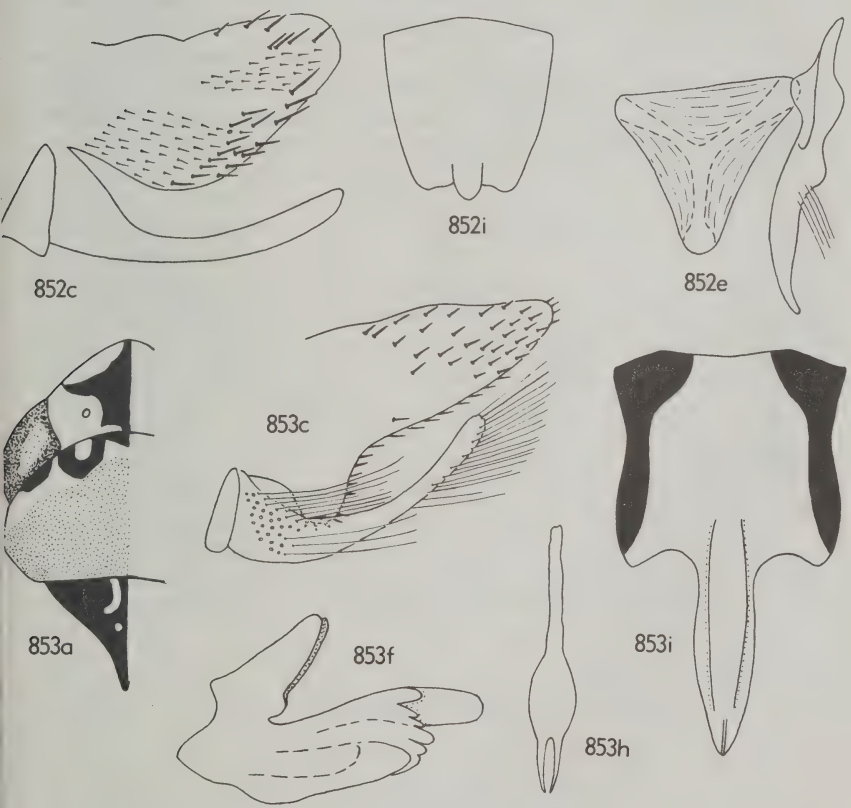


FIGURE 851.—*Borogonalia impressifrons* (Signoret) (see also fig. 852) (*a*, *b*, *d*, *h*, from specimen from Manizales, Colombia; *c* from Cochabamba, Bolivia; *e* from Zipaquirá, Colombia; *p* from Baños, Ecuador; remainder from Pasto, Colombia; *h* from lateral view): *p*, Female abdominal sternum VII from ventral view.

I am indebted to Dr. James P. Kramer for suggesting changes leading to the present form of the key to species.

Judging from the host plant labels attached to a number of specimens collected by entomologists of the Agricultural Program of the Rockefeller Foundation, in Colombia, and loaned to me through Dr. R. F. Ruppel, *Borogonalia* is an important economic genus. They collected *B. impressifrons* (Signoret) from alfalfa, beans, beets, carrots, corn, *Dolichos* sp., grass, potatoes, and strawberries. I have also seen specimens from El Junquito, Venezuela which were collected on *Buddleja americana* L. As noted below, some specimens of *B. crinata*, n. sp., were collected on an unknown species of Asclepiadaceae in Abancay, Peru.

My interpretation of *Tettigonia impressifrons* Signoret is based on a comparison of the genitalia of the male lectotype with illustrations made earlier from a specimen from Colombia. I have reduced *Tettigoniella perspicillatula* Jacobi to



FIGURES 852, 853.—852, *Borogonalia impressifrons* (Signoret) (see also fig. 851) (*c, e,* from specimen from Zipaquirá, Colombia, *i* from lectotype of *Tettigoniella perspicillatula* Jacobi). 853, *B. cruciatula* (Breddin) (*i* from lectotype; remainder from specimen from Baños, Ecuador).

synonymy on the basis of sketches of the female lectotype (but with some misgivings for I have not found another female with abdominal sternum VII precisely like fig. 852*i*).

My interpretation of *Tettigonia cruciatula* Breddin is based on a study of the female lectotype and of comparable specimens of both sexes.

SPECIES OF *BOROGONALIA*

crinata, n. sp. Peru.
cruciatula (Breddin), 1902a:178 (*Tettigonia*). Ecuador. New combination.
impressifrons (Signoret), 1854a:16 (*Tettigonia*). Venezuela, Colombia, Ecuador to Bolivia, SE. Brazil. New combination.
perspicillatula (Jacobi), 1905c:177 (*Tettigoniella*). New synonymy.

KEY TO SPECIES OF *BOROGONALIA*

1. Male with plates not extending nearly as far posteriorly as pygofer apex, pygofer with a convex basiventral lobe, paraphyses median; female abdominal sternum VII strongly produced
cruciatula (Breddin) (fig. 853)

Male plates extending almost or entirely as far posteriorly as pygofer apex, pygofer without such a convexity, paraphyses not in median plane; female abdominal sternum VII not nearly as strongly produced 2

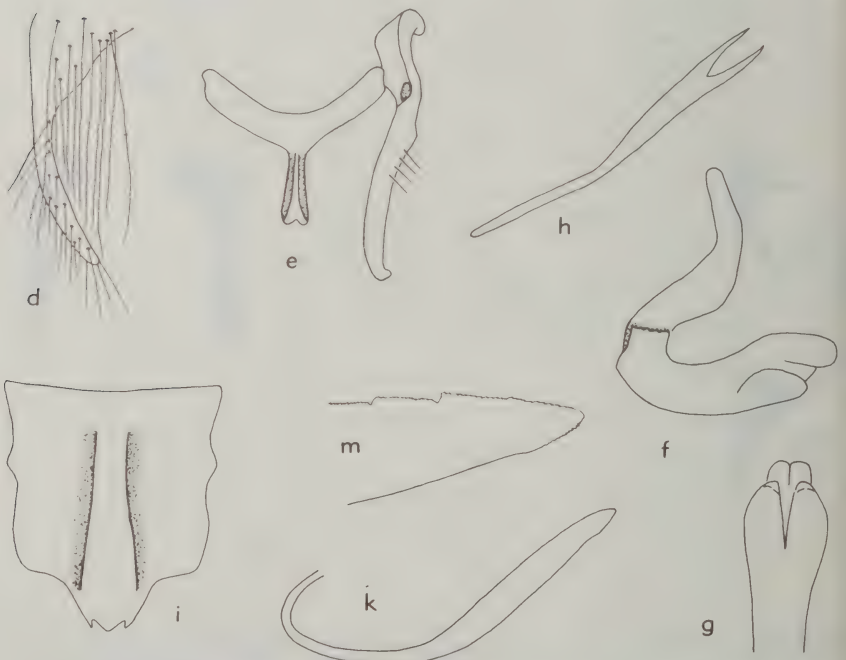


FIGURE 854.—*Borogonalia crinata*, n. sp. (*i*, *k*, *m*, from specimen from 10 km. South of Chiclayo, Peru; remainder from holotype; *h* from lateral view; only aedeagal apex shown in *g*).

2. Male with elongate microsetae occurring mostly on basal half of plates; female abdominal sternum VII not keeled and with teeth on apical three-fourths of second valvulae of ovipositor
impressifrons (Signoret) (figs. 851, 852)

Male with elongate microsetae throughout length of plates; female abdominal sternum VII keeled and with teeth only on apical one-half of second valvulae of ovipositor ..... *crinata*, n. sp.

Borogonalia crinata, NEW SPECIES

FIGURE 854

Length of male 4.4-6.3 mm, of female 5.3-6.8 mm. Head with median length of crown varying from six-tenths to slightly less than seven-tenths interocular width and from one-third to four-tenths transocular width. Male plates with numerous elongate microsetae, without macrosetae. Female abdominal sternum VII keeled medially, with apex of median produced portion bearing a shallow median notch which bears a broad convexity; ovipositor with second valvula bearing teeth on apical one-half of its dorsal margin. Black markings of crown variable in extent, at most as in the illustration of *B. impressifrons* (Signoret) (fig. 851*a*), at least with an arcuate anteapical marking and a spot on apex; scutellum varying from unmarked to black from anterior margin to transverse sulcus, except a pair of pale circles and the lateral margins of this area; face unmarked yellow. Other characters as in generic description.

Holotype male, Abancay, Peru, July 12, 1960 (Salazar and Young), and a series of 55 additional topotypic specimens of both sexes, two collected from Asclepiadaceae (NCS). Eleven specimens, both sexes, from 10 km. south of Chiclayo, Peru, March 21, 1951 (Ross and Michelbacher) (CAS). Holotype on indefinite loan to USNM.

B. crinata, n. sp., is very similar to *B. impressifrons* (Signoret) from which it can be separated easily by the characters used in the key. The numerous, matted, close-set microsetae are conspicuous in unmacerated specimens, extending beyond the apices of the plates, and often concealing the ventral surface of the plates in dried specimens; in *impressifrons* the elongate microsetae are more nearly restricted to the basal half, and do not extend beyond the midlength of the plates, the macrosetae being readily observed in dried specimens.

144. TORTIGONALIA, NEW GENUS

FIGURES 855-859

Type-species: *Tortigonalia torta,* new species.

Length of male 6.5-8.2 mm, of female 6.8-7.5 mm.

Head with median length of crown varying from slightly less than three-tenths to slightly less than four-tenths transocular width, ocelli located behind a line between anterior eye angles, each ocellus slightly closer to median line than to adjacent anterior eye angle. Thorax with pronotal width equal to or

less than transocular width of head, lateral margins parallel or slightly convergent anteriorly. Forewing with membrane sharply delimited basally, including all of first, and apical portions of second, third, and fourth apical cells, veins obscure. Hindleg with femoral setal formula 2:1:1 or 2:1:1:1. Other characters, except genitalia, as in *Borogonalia*, new genus.

Male genitalia: Pygofer well produced and strongly convex posterodorsally, with a number of macrosetae confined to the apical and anteapical region, pygofer processes absent. Plates elongate triangular, extending posteriorly almost as far as pygofer apex, without elongate microsetae, with uni- or multiseriate macrosetae (variable interspecifically). Style elongate, extending posteriorly beyond apex of connective, twisted apically and hooklike in form, preapical lobe distinct. Aedeagus with shaft short, with one or two pairs of apical or ventral anteapical processes. Paraphyses poorly developed and poorly delimited, occurring as a single median partially sclerotized area behind connective.

Female abdominal sternum VII elongate with posterior margin broadly convex at least medially. Genital chamber without sclerites or with a pair of very small sclerites between bases of first valvulae. Ovipositor with second valvulae each bearing quadrate primary teeth, each of which bears denticles, in all of portion beyond basal curvature, and with anteapical dorsal and ventral denticles, apex acute (much like illustration of *Borogonalia impressifrons* (Signoret) (fig. 851*m*)).

Species of *Tortigonalia* are marked much as those of *Borogonalia*, new genus. In the females the face is pale except for a median dorsal black spot at transition to crown. Association of sexes has been a most difficult problem, and field observations are needed to verify or refute the accuracy of this phase of this work.

Species of *Tortigonalia* have been examined from northern Brazil, Ecuador, Peru, and Bolivia. *Tortigonalia*, new genus, is closely related to *Borogonalia*, new genus, in the discussion of which distinguishing characters are treated.

In company with Juan Salazar, and Carlos Ramirez from the Estación Experimental in La Molina, Peru, I collected a series of *T. treva*, n. sp., mostly from grasses, in Chanchamayo, Peru, near San Ramón. There are no other host plant data available.

SPECIES OF *TORTIGONALIA*

adunca, n. sp. Ecuador.
chlorella, n. sp. Peru, Bolivia.
hamata, n. sp. Peru, Bolivia.
torta, n. sp. Peru, Bolivia, N. Brazil.
treva, n. sp. Ecuador, Peru.

KEY TO MALES OF *TORTIGONALIA*

1. Aedeagus in caudoventral view with two pairs of apical processes
adunca, n. sp., page 1055

Aedeagus in caudoventral view with only one pair of apical processes 2

2. Plates with uniseriate macrosetae at least in apical two-thirds (row occasionally slightly irregular near base) 3
Plates with multiseriate macrosetae 4

3. Aedeagus in lateral view broader, shaft narrower in caudoventral view, clypellus black ..... *hamata*, n. sp.
Aedeagus in lateral view narrower, shaft shorter and broader in caudoventral view, clypellus pale ..... *torta*, n. sp., page 1057

4. Aedeagus with shaft slender, more elongate (fig. 858*g*); face pale except a median black spot at transition to crown
chlorella, n. sp., page 1059
Aedeagus with shaft shorter (fig. 859*g* and 859*p*); face predominantly black ..... *treva*, n. sp., page 1059

Tortigonalia adunca, NEW SPECIES

FIGURE 855, PAGE 1056

Length of male 6.5-6.7 mm, of female 6.9-7.5 mm. Male pygofer with all macrosetae located close to apex; plates with macrosetae multiseriate but not numerous; aedeagus in ventral view with shaft short, with a transverse anteapical ridge from which a short curved acute process arises on each side, and with a pair of recurved processes arising more dorsally. Face of male with clypeus and clypellus variably infuscate, from completely dark except for narrowly yellowish lateral margins (holotype) to completely pale yellowish except for a large black spot at transition to crown, lora and genae varying from pale yellowish to mostly black.

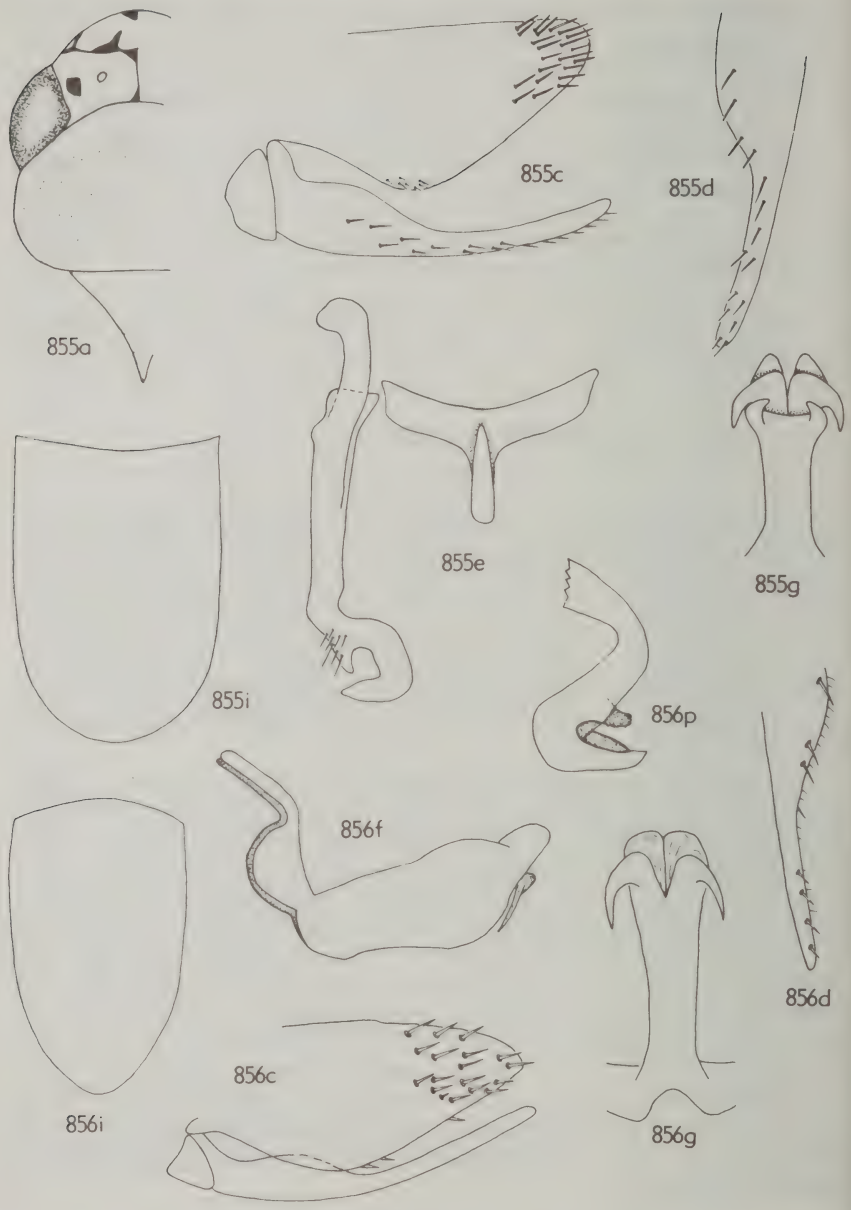
Holotype male, one additional male and one female, Baños, Ecuador, August 27, 1937 (W. Clark-Macintyre), Río Blanco, 2000 m.; and one female, same data except August 14, 1937, Tungurahua, 1900 m. (USNM): the two males are mounted on the same point — the specimen at the tip of the point is the holotype. Also a male and female, Baños, Ecuador, April 14, 1939, 1800 m. (W. Clark-Macintyre); one male, same data except April 3, 1939 and 1900 m.; one male, same data except July 14, 1939 and 2000 m.; one male "Rio Huagra-Yacu", Oriente, Ecuador, April 3, 1941 (W. Clark-Macintyre); one male, Río Arajuno, Napo watershed, April 24, 1941 (W. Clark-Macintyre) (NCS). Also one female, 2-8 m. north of Pungo, Napo Pastaza, Ecuador, 935 m., February 9, 1955 (E. I. Schlinger and E. S. Ross) (CAS).

T. adunca, n. sp., can be separated from other species in the genus by the distinctive form of the aedeagus in the male, and from other species in which the female is known by the longitudinally fluted appearance of the disk of abdominal sternum VII.

Tortigonalia hamata, NEW SPECIES

FIGURE 856, PAGE 1056

Length of male 6.9-7.3 mm, of female 6.9-7.0 mm. Male pygofer with most of macrosetae located as in *T. adunca*, n. sp.; plates with macrosetae sparse



FIGURES 855, 856.—855, *Tortigonalia adunca,* n. sp. (*i* from specimen from Ecuador; remainder from holotype; only aedeagal apex shown in *g*). 856, *T. hamata,* n. sp. (*i* from specimen from Bolivia; remainder from Coroico, Yungas, Bolivia; dorsal apodemes not shown in *g*): *p,* Style apex from lateral view.

and essentially uniseriate; aedeagus in ventral view with shaft not very broad, with a pair of ventral anteapical recurved processes; aedeagus in lateral view with shaft very broad, and broadest anteapically. Female abdominal sternum VII with posterior margin more narrowly convex than in other species. Face of male with clypeus and clypellus black except for a narrow lateral marginal yellow to orange stripe on each side of clypeus, extending onto clypellus in some specimens.

Holotype and 11 additional males, Coroico, Yungas, Bolivia, April 16, 1899; one male, same locality, April, 1899; two males, same locality, November 20 and December 9, 1898; two females, Coroico, Bolivia (OSU). Also 12 males, Yungas de Palmar, Bolivia, 100 m., November, 1960 (A. Martinez) (SSM). Two males, Coroico, Bolivia, both bearing "typus" labels and a Melichar manuscript name (HNHM).

T. hamata, n. sp., can be separated most readily from other species of the genus by the distinctive form of the aedeagus of the male, in lateral view; and by the unlobed more narrowly convex seventh sternum of the female.

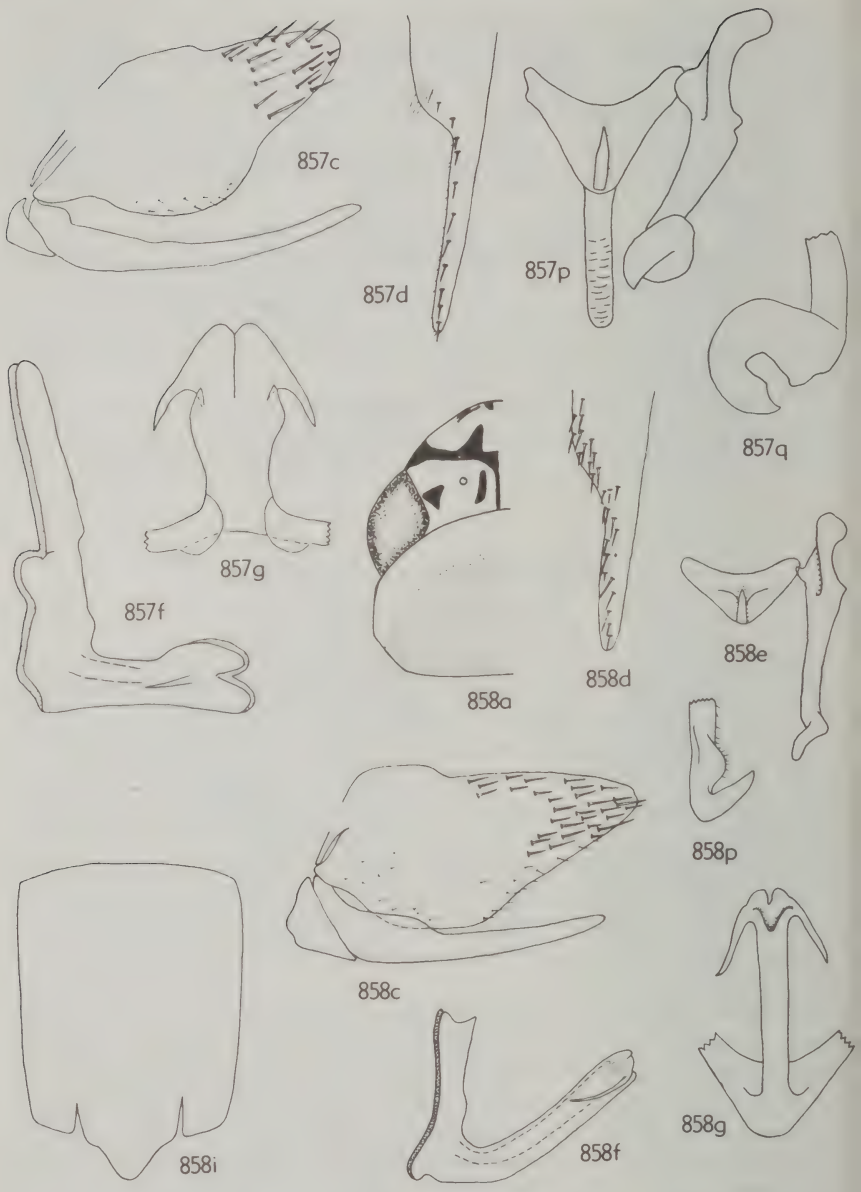
Tortigonalia torta, NEW SPECIES

FIGURE 857, PAGE 1058

Length of male 7.8-8.2 mm. Male pygofer in lateral view with posteroventral margin strongly concave subapically, the pygofer appearing almost constricted as a result, macrosetae on apical lobe, and a few microsetae along ventral margin; plates with uniseriate macrosetae; aedeagus very short and broad in ventral view, and with lateral margins of shaft convex basad of the single pair of apical retrorse processes, in lateral view with shaft not as broad anteapically as in *T. hamata*, n. sp. Face of male with clypeus varying from completely yellow except for a black spot at transition to crown to predominantly black except laterally, the variation being the degree to which the dark marking extends ventrally from the dorsal portion of the clypeus; clypellus, lora, and genae, pale yellow, in some specimens with a small black spot below antennal base.

Holotype male and 16 additional males, Monsón Valley, Tingo María, Peru, December 9, 1954 (E. I. Schlinger and E. S. Ross); four males, same data except December 23, 1954; six males, same data except November 10, 1954; and one male, same data, except December 2, 1954 (CAS). One male, Callanga, Peru (ZIL). One male, labeled "Peru" and bearing a Melichar determination label (a manuscript name) and a "Typus" label (HNHM). One male, Yungas de Palmar, Bolivia, 1100 m., November, 1960 (A. Martinez) (SSM). I have also studied, earlier, a male from "Itaituba", Brazil from the USNM collection.

T. torta, n. sp., can be separated most readily from other species of the genus by the character combination of aedeagal form and uniseriate setae on the male plates.



FIGURES 857, 858.—857, *Tortigonalia torta*, n. sp. (from specimen from Itaituba, Brazil; dorsal apodemes not shown in *g*): *p*, Style, connective, and paraphysis, from dorsal view; *q*, style apex from lateral view. 858, *T. chlorella*, n. sp. (*i* from specimen from Coroico, Bolivia; remainder from holotype; only basal portions of dorsal apodemes shown in *g*): *p*, Style apex from lateral view.

Tortigonalia chlorella, NEW SPECIES

FIGURE 858, PAGE 1058

Length of male 6.2-7.2 mm, of female 7.2-7.4 mm. Male pygofer with macrosetae more extensive and more numerous than in other species in the genus; plates with numerous multiseriate macrosetae; aedeagus with shaft more slender and elongate than in any other species of *Tortigonalia*, with a single pair of retrorse processes arising at apex. Female abdominal sternum VII trilobate posteriorly, the median lobe more produced and convex, the lateral lobes almost transverse apically. Face of male yellow with a median black spot at transition to crown and a subantennal black spot on each gena.

Holotype male, "Yungas", Bolivia (USNM). Three males and two females, Coroico, Bolivia (OSU).

T. chlorella, n. sp., is most similar to *T. hamata*, n. sp., in the shape of the aedeagus in caudoventral view, but the aedeagus of the latter is much broader in lateral view. *T. hamata* also has sparse uniseriate macrosetae on the male plates, instead of numerous multiseriate macrosetae as in *chlorella*. The form of the abdominal sternum VII, with the two excisions is somewhat like the female of *T. treva*, n. sp., but in the latter the excisions are located much more laterobasally.

Tortigonalia treva, NEW SPECIES

FIGURE 859

Length of male 6.2-7.5 mm, of female 6.8-7.0 mm. Male pygofer with same constricted appearance as in *T. torta*, n. sp., macrosetae numerous on narrowed apical lobe and extending ventrally along posteroventral margin; plates with numerous multiseriate macrosetae; aedeagus in ventral view with shaft short, usually parallel-margined and slender, occasionally convex

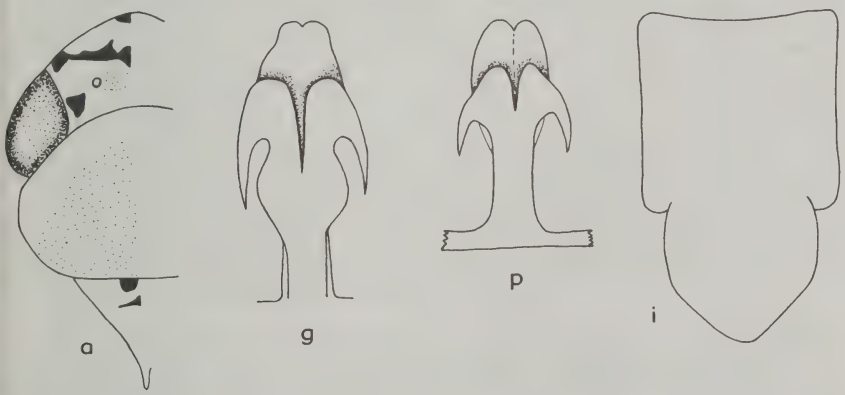


FIGURE 859.—*Tortigonalia treva*, n. sp. (*a, i*, from specimens from Chanchamayo, Peru; *g* from Callanga, Peru; *p* from Monsón Valley, Peru; dorsal apodemes not shown in *g*): *p*, Aedeagal shaft from caudoventral view.

apically, with a single pair of retrorse processes which appear more anteapical than in other species because of the more elongate dorsal apical lobes. Face of male with clypeus and clypellus usually dark, clypeus with broad yellow lateral margins which extend a short distance onto clypellus in some specimens. Female abdominal sternum VII with a distinct notch at base of the apical convex lobe.

Holotype male, Chanchamayo, Peru, July 22, 1960, on Gramineae (J. Salazar), and a series of additional specimens of both sexes (but mostly males), July 21, 22, and 25, some from Gramineae and Leguminosae (J. Salazar, C. Ramirez, and D. A. Young) (NCS). Also, 16 males, Monsón Valley, Tingo María, Peru, December 9, 1954 (E. I. Schlinger and E. S. Ross); two males, same data as preceding except December 23 and October 26; two males, 26 m. east of Tingo María, Peru, 1100 m., December 10, 1954 (E. I. Schlinger and E. S. Ross); one male, 40 m. south of Tingo María, 'Carpish Mts.", December 28, 1954 (same collectors) (CAS). Also one male, Callanga, Peru, bearing a Melichar manuscript name and a "Typus" label (HNHM). Holotype on indefinite loan to USNM from NCS.

T. treva, n. sp., can be separated from other species of the genus by the shape of the aedeagus in caudoventral view, considered in combination with the multiseriate setae of the male plates. The female is slightly similar to *T. chlorella*, n. sp., in the discussion of which distinguishing characters are treated.

145. LAUTERERIA, NEW GENUS

FIGURE 860-867

Type-species: *Cicadella signatula* Osborn.

Length 6.7-7.7 mm.

Head strongly produced, median length of crown varying from two-thirds to more than eight-tenths interocular width and from four-tenths to slightly less than six-tenths transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each about equidistant from median line and adjacent anterior eye angle, crown with a distinct transverse concavity before ocelli, without a median fovea, disk without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; clypeus convex but flattened medially, muscle impressions distinct, transclypeal suture obsolete medially, clypellus not strongly produced, contour of its lower portion more nearly parallel to long axis of body than remainder of facial profile.

Thorax with pronotal width approximately equal to transocular width of head, lateral margins slightly convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk sparsely punctate, not pubescent; scutellum not striate behind transverse sulcus. Forewing with membrane including only inner half of inner apical cell and very narrow apical portions of

remaining apical cells, veins not elevated, distinct, with three closed anteapical cells, with four apical cells and base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere slightly greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, convex or subtruncate apically, with macrosetae (of mixed sizes or uniform) occurring in a diagonal group that is somewhat parallel to posteroventral pygofer margin, tergum often not sclerotized near midline at base, with a dorsal process extending posteriorly but not attaining posterior pygofer margin (ventral process also in *L. helvola* (Melichar)). Plates slender, triangular, not extending posteriorly as far as pygofer apex, with uniseriate macrosetae. Style extending posteriorly as far as or farther than apex of connective, with or without a preapical lobe, apex narrowly rounded or truncate. Connective Y- or V-shaped, with arms widely divergent. Aedeagus short, small, without processes or with a basiventral process extending anteroventrally, shaft with or without rasplike processes. Paraphyses absent.

Female (based on *L. signatula* (Osborn) and *L. apperita*, n. sp.) abdominal sternum oblong, with posterior margin slightly and broadly convex. Genital chamber without sclerites. Ovipositor with first valvifer bearing a triangular lobe that extends posteriorly or posteroventrally; second valvulae each bearing teeth on dorsal margin in most of portion beyond basal curvature, the primaries quadrate, sloping posteriorly, each with a number of minute secondaries, with minute dorsal and ventral anteapical denticles, apex acute. Pygofer subangularly rounded posterodorsally, with sparse macrosetae parallel to posteroventral margin.

Specimens of *Lautereria* are dark green to blue, the anterior dorsum darker and strongly marked with black.

I take pleasure in naming this genus in honor of Pavel Lauterer, of the Moravské Museum in Brno, Czechoslovakia, who has been most cooperative in the course of this work and who, with his family, helped to make a busy visit in Czechoslovakia a pleasant memory.

Lautereria ranges from Colombia to Bolivia and East to central Brazil. Species are similar in appearance to those of the new genera *Catagonalia* and *Tantogonalia*, but the males lack the apical aedeagal processes found in both of these genera, and the females are distinctive in the form of the first valvula of the ovipositor, described above, a condition not formed in other Cicadellini with the possible exception of *Aspilodora* Melichar (fig. 886), a genus that seems otherwise only remotely related.

My identifications of *Cardioscarta helvola* Melichar and *C. oriunda* Melichar are based on the respective male lectotypes. The present interpretation of *Cicadella signatula* Osborn is based on a study of the holotype female and males which I believe to be conspecific with it.

SPECIES OF *LAUTERERIA*

apperita, n. sp. Central Brazil.
dietzi, n. sp. Colombia.
helvola (Melichar), 1932a:320 (*Cardioscarta*). W. Brazil. New combination.
mozana, n. sp. N., central, and W. Brazil.
oriunda (Melichar), 1932a:320 (*Cardioscarta*). Peru, New combination.
signatula (Osborn), 1926b:200 (*Cicadella*). Peru, Bolivia. New combination.
tapirapensis, n. sp. Central Brazil.
unocahua, n. sp. Peru.

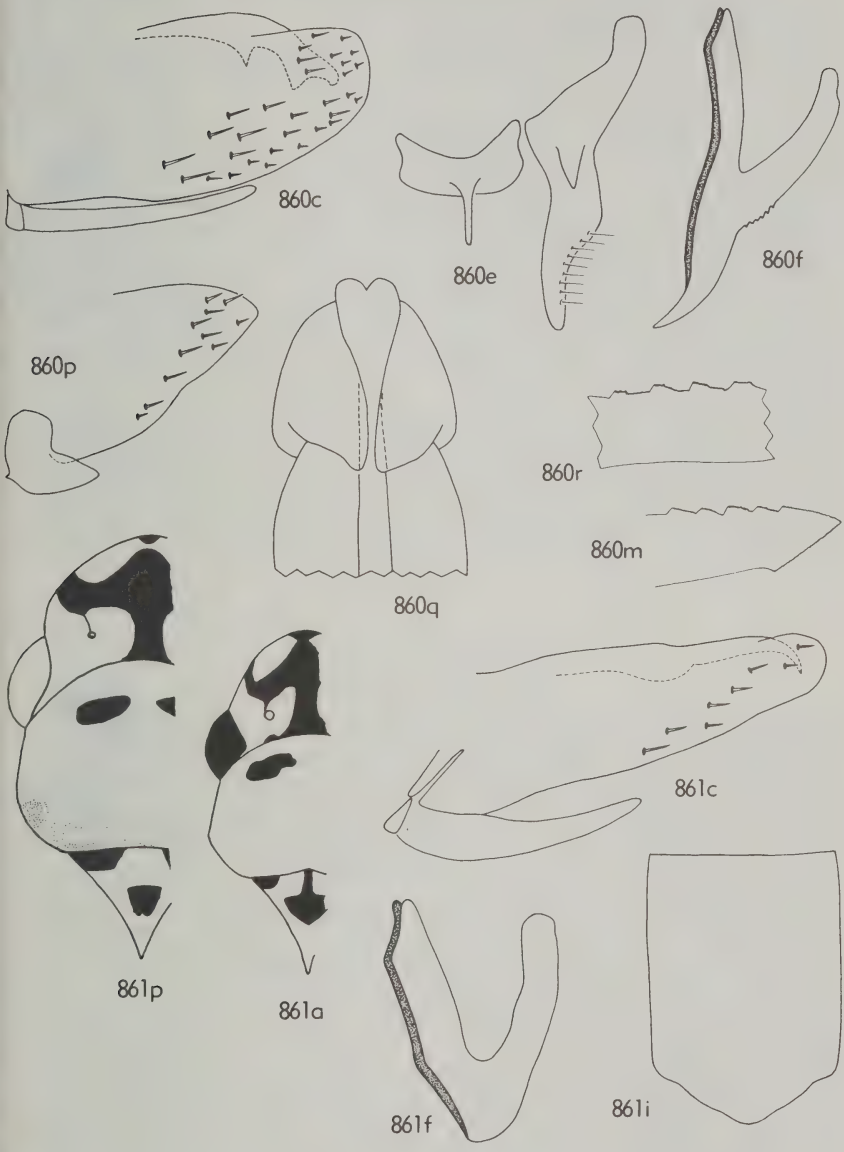
KEY TO MALES OF *LAUTERERIA*

1. Pygofer process broadened and concavely truncate at apex (fig. 860*c*) *apperita*, n. sp.
   Pygofer process not broadened apically, if truncate then not concave 2
2. Aedeagus in lateral view broadly convex below atrium, without a preatrial ventral portion 3
   Aedeagus in lateral view with an acute preatrial portion, or with an acute ventral process near base of shaft 6
3. Aedeagus more slender (figs. 862*f*, 863*f*), apex acute and directed posterodorsally 4
   Aedeagus broader, apex rounded and directed anterodorsally *signatula* (Osborn) (fig. 861)
4. Aedeagal shaft strongly bisinuate in lateral view *helvola* (Melichar) (fig. 862)
   Aedeagal shaft very weakly curved in lateral view 5
5. Pygofer process truncate in lateral view (fig. 864*c*) *mozana*, n. sp., page 1066
   Pygofer process acute apically (fig. 863*c*) .... *dietzi*, n. sp., page 1064
6. Aedeagus in caudoventral view truncate at apex and with very short lateroapical processes (fig. 865*g*) .... *unocahua*, n. sp., page 1066
   Aedeagus not as above 7
7. Aedeagal shaft strongly sinuous in lateral view (fig. 866*f*) *tapirapensis*, n. sp., page 1068
   Aedeagal shaft straight in lateral view .... *oriunda* (Melichar) (fig. 867)

Lautereria apperita, NEW SPECIES

FIGURE 860, PAGE 1063

Length of male 7.1-7.3 mm, of female 7.3-7.7 mm. Head with median length of crown varying from two-thirds to three-fourths interocular width, and from four-tenths to one-half transocular width. Male pygofer with apex broadly convex, pygofer process broader than in other species of the genus, broadened apically and concave; style extending posteriorly farther than apex of connective, without a preapical lobe, apex narrowly rounded; connective



FIGURES 860, 861.—860, *Lautereria apperita,* n. sp. (*c, e, f,* from holotype; remainder from topotype): *p,* Female pygofer and first valvifer, left side, from lateral view; *q,* basal portion of female pygofer, first valvifers, and basal portion of ovipositor, from ventral view; *r,* basalmost teeth of second valvula. 861, *L. signatula* (Osborn) (*p* from holotype; remainder from specimen from Monsón Valley, Peru): *p,* Anterior dorsum.

short; aedeagus with preatrial portion distinct, acute, shaft curved regularly caudodorsally, not sinuate.

Color of crown, pronotum, and scutellum greenish-yellow, a conspicuous cruciate design on crown, a pair of spots on anterior half of pronotum and a band along its posterior margin, basal angles and a median sagittate marking on scutellum, black; forewing sordid green with variable dull yellow suffusions near costal margin (more extensive in some specimens), with a narrow marginal black border extending entire length of costal margin, around apex and basally to claval apex; clypeus black except two transverse marginal areas at base, a median longitudinal and two lateral parallel oval spots which are yellow, clypellus black, lora and genae yellow except a vertical black mark on each gena below eye; proepimeron black beneath dorsopleural carina, mesepisternum and mesosternum black, remainder of thoracic pleura, venter, and legs yellow to brownish-yellow.

Holotype male, Barra do Tapirape, Mato Grosso, January 9, 1963 (B. Malkin); two females, same data except January 6, 1963; four males and three females, same data except December 21, 1962 (all CAS). Several of the specimens are distorted, as if struck by the rim of a net or fan blades.

L. apperita, n. sp., is most readily separated from other species in the genus by the distinctive shape of the male pygofer processes.

Lautereria dietzi, NEW SPECIES

FIGURE 863, PAGE 1065

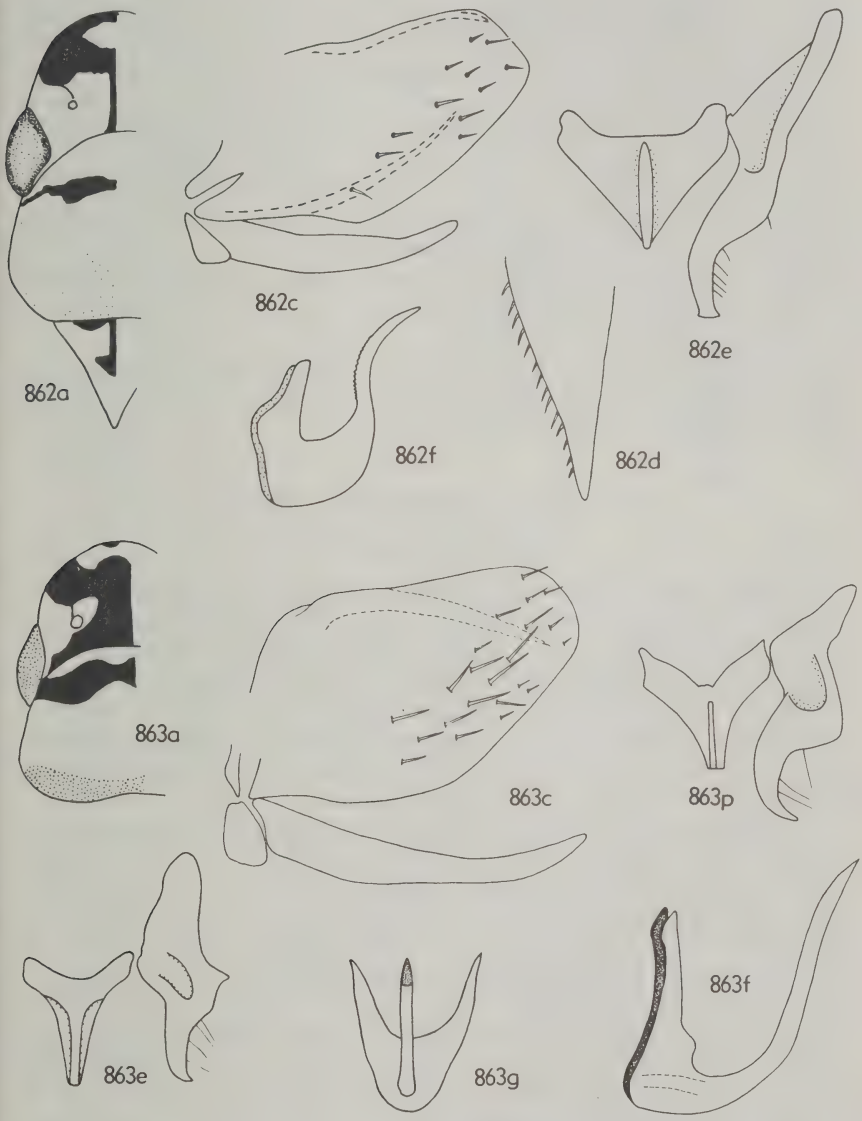
Length of male 7.5-7.7 mm, of female 7.6 mm. Head with median length of crown three-fourths interocular width, and from one-half to slightly more than one-half transocular width. Male pygofer with posterodorsal margin broadly convex, appearing almost truncate, pygofer process slender and acute; style extending posteriorly as far as or slightly farther than apex of connective, without a preapical lobe (with a lobe at midlength), apex acute; aedeagus without a preatrium, shaft very slightly bisinuate, acute apically.

Color of crown ivory, of pronotum ivory suffused with bluish, crown marked with black as in *L. apperita*, n. sp., except that vertical portion of cruciform marking is lacking anteapically, with a pair of transverse spots or a black band on anterior half of pronotum, with a blue or black band along its posterior margin; scutellum black with an arcuate row of small pale spots across disk and with or without a pale narrow border on apical portion; forewing deep blue, with black border as in *apperita*; face black except a lateral yellow spot astride clypeal suture on each side continuous with yellow genae which are marked as in *apperita*, clypeus with or without a median pale spot which is variable when present; thoracic pleura, venter, and legs as in *apperita*.

Holotype male, Bogotá, Colombia (L. Richter) and one female, Colombia, 1941 (L. Richter) (NCS). One male and one female, Colombia (bearing Melichar's determination label: oriunda m.) (HNHM). One male and one female, Caquetá, Colombia, 4-10 mi. south of Florencia, January 13-14, 1969 (R. E. Dietz IV) (USNM). Holotype on indefinite loan to USNM from NCS.

I am pleased to name this species in honor of Mr. Robert Dietz, a friend and former student, who collected two specimens of the series at hand.

L. dietzi, n. sp., is very close to *L. helvola* (Melichar) in which the aedeagus is much more strongly sinuate.



FIGURES 862, 863.—862, *Lautereria helvola* (Melichar) (*a* from topotype; remainder from lectotype). 863, *L. dietzi*, n. sp. (*f, p,* from specimen from Caquetá, Colombia; remainder from holotype): *p,* Style and connective, from dorsal view.

Lautereria mozana, NEW SPECIES

FIGURE 864, PAGE 1067

Length of male 7.1 mm, of female 6.8-7.6 mm. Head with median length of crown at least eight-tenths interocular width, and from five-tenths to six-tenths transocular width. Male pygofer narrowly convex posterodorsally, pygofer process not broader than in most other species in the genus, but truncate apically; styles, connective and aedeagus as in *L. dietzi*, n. sp. (above).

Color of crown and pronotum as in *dietzi*; scutellum varying from color pattern of *apperita*, n. sp. (type), to black with a pair of small pale marks at midlength of lateral margin; face with a broad transverse yellow stripe between black clypeus and clypellus, middle of clypeus with a longitudinal pale ivory or yellow mark of variable shape and extent, occasionally merely a lobe of the transclypeal band, or completely separated from the latter, and occasionally bearing a central black spot, genae, pleura, venter, and legs as in *apperita*.

Holotype male, Olivença, Upper Amazon, Brazil; two males and four females, Fontebôa, Brazil (RMS).

L. mozana, n. sp., is similar to *dietzi*, but the broadly separated black marking of clypeus and clypellus of *mozana*, and the truncate pygofer process of the male will separate it readily from *dietzi*.

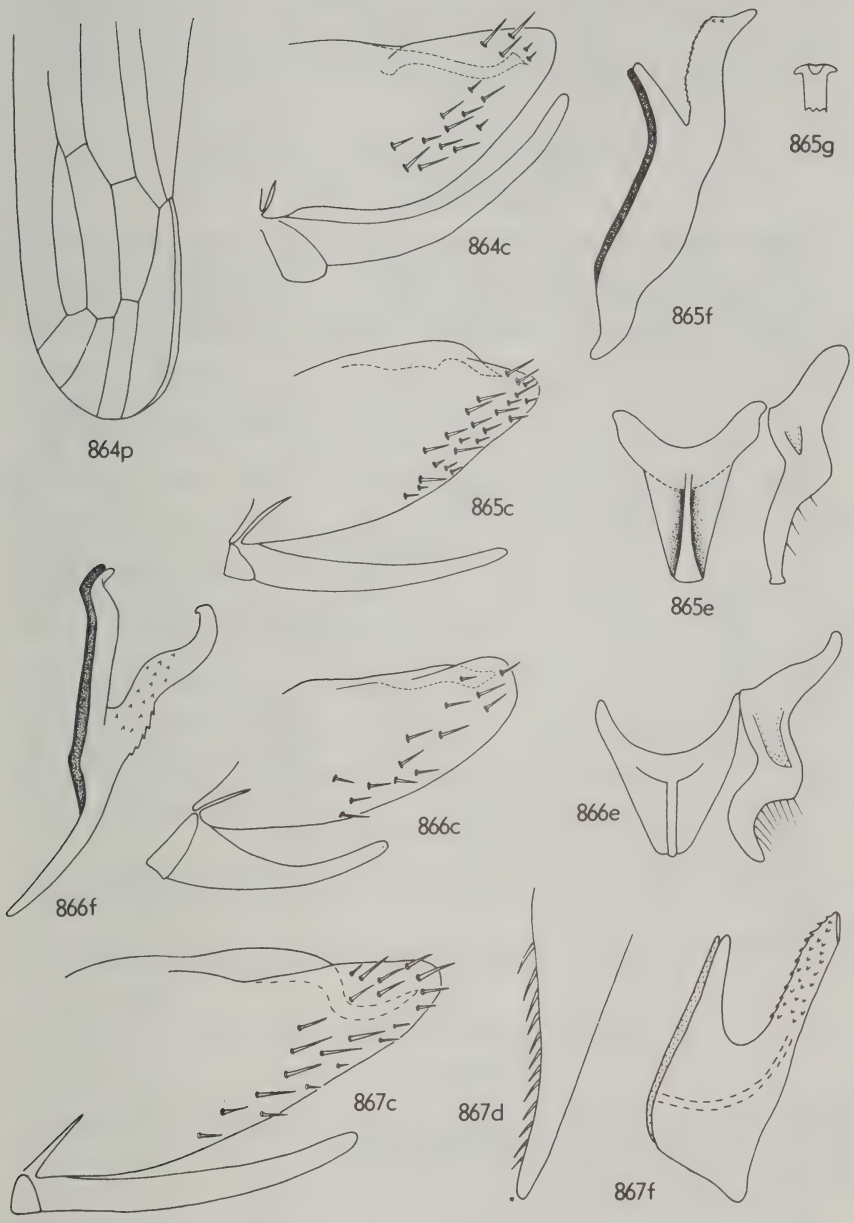
Lautereria unocahua, NEW SPECIES

FIGURE 865, PAGE 1067

Length of male 7.2 mm. Head with median length of crown two-thirds interocular width and less than one-half transocular width. Male pygofer with apex narrowly convex, pygofer process tapering and acute in its apical half; style extending posteriorly as far as apex of connective, without a preapical lobe, apex truncate; connective long compared to other species in the genus. Aedeagus with preatrial portion distinct, acute, shaft in lateral view extending dorsally, with a narrower apical portion extending posterodorsally, apex truncate in caudoventral view and slightly expanded at apex.

Color of crown ivory with a conspicuous cruciate marking on disk and with a slender lateral extension along posterior margin of head on each side, black; pronotum with anterior two-thirds olive green, posterior third darker green, with a pair of large black spots in basal third, connected across median line by a narrow black line; scutellum with black markings as in *L apperita*, n. sp. (above); forewing sordid green with olive suffusion near costal margin in its basal half, black border very narrow on costa except at base, becoming broader at wing apex and extending basad to claval apex; face black except two pale spots at transition to crown; proepisternum ivory, proepimeron ivory except a black marking beneath dorsopleural carina and black lower extremity; lower portion of mesepisternum and mesosternum black, remainder of pleura and venter yellow, legs brownish-yellow.

Holotype male, 10 mi. southwest of Las Palmas, Huánuco, Peru, 1000 m., September 17, 1954 (E. I. Schlinger and E. S. Ross) (CAS).



FIGURES 864-867.—864, *Lautereria mozana,* n. sp., holotype: *p,* Apical portion of forewing. 865, *L. unocahua,* n. sp., holotype (only apex of aedeagus shown in *g*). 866, *L. tapirapensis,* n. sp., holotype. 867, *L. oriunda* (Melichar), lectotype.

The form of the aedeagus of the male will distinguish *L. unocahua* from other species of the genus. The black markings of the anterior dorsum are similar to a specimen of *L. signatula* (Osborn) from Monsón Valley, Peru (fig. 861*a*). The black face of *unocahua* is different from other species of the genus.

Lautereria tapirapensis, NEW SPECIES

FIGURE 866, PAGE 1067

Length of male 7.1 mm. Head with median length of crown two-thirds interocular width, and less than one-half transocular width. Male pygofer with dorsoapical margin broadly convex, pygofer process oblique at apex; style extending posteriorly about as far as apex of connective, with a preapical lobe (near midlength), apex narrowly rounded; connective as long as in any other species in the genus; aedeagus with preatrial portion almost one-half as long as shaft, acute basally, shaft strongly bisinuate, with apex directed dorsally in lateral view, shaft with a number of small denticles.

Color of crown, pronotum, and scutellum dull yellow, crown with a conspicuous cruciate black mark, the basal part of vertical portion not extending laterally along posterior margin of head; pronotum with a pair of black spots in basal third and with or without poorly delimited dark marking along posterior margin; scutellum with black markings as in *L. apperita*, n. sp., forewing with black margin as in *L. unocahua*, n. sp. Face with a median and two lateral elongate yellow longitudinal areoles on clypeus, each of the lateral ones extending ventrally across transclypeal suture to basal portion of clypellus, with a transverse yellow areole on each side at transition from crown to face, the areoles bordered with black, remainder of clypellus black, lora and genae yellow with a vertical black stripe below eye; proepimeron with a black mark below dorsopleural carina; mesepisternum mostly black; mesosternum black; remainder of pleura, thoracic venter, and legs yellow.

Holotype male, Barra do Tapirape, Mato Grosso, Brazil, January 9, 1963 (B. Malkin), and one additional male, same data except December 21, 1962 (CAS).

L. tapirapensis, n. sp., is distinctive in its strongly bisinuate aedeagus.

146. GENUS CATAGONALIA EVANS

FIGURES 868, 869

Catagonia Melichar, 1926a:342. Type-species: *Tettigonia lunata* Signoret, by subsequent designation of China, 1938d:184 (preoccupied).

Catagonalia Evans, 1947a:160 (new name).

Length 8.3-10.4 mm.

Head moderately produced, median length of crown from slightly less than two-thirds to seven-tenths interocular width and from slightly less than four-tenths to slightly less than one-half transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each closer to adjacent

anterior eye angle than to median line of crown, crown with a shallow concavity before ocelli, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex, not or weakly carinate; clypeus convex medially, muscle impressions not very distinct, face without pubescence, transclypeal suture incomplete medially, clypellus with contour continuing profile of remainder of face, or nearly so.

Thorax with pronotal width approximately equal to transocular width of head, lateral margins parallel, dorsopleural carinae complete, posterior margin concave, disk without sculpturing; scutellum without transverse rugae on posterior portion. Forewing with membrane including all of apical cells,

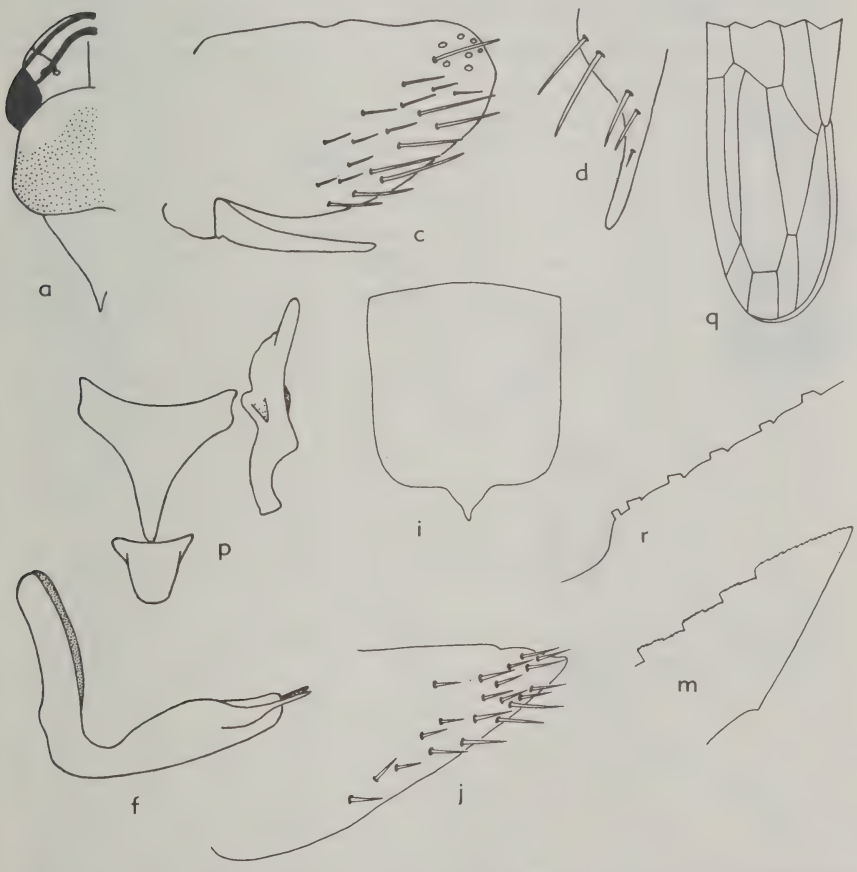


FIGURE 868.—*Catagonalia lunata* (Signoret) (*q* from specimen from Monsón Valley, Peru; remainder from specimens from Teffé, upper Amazon, Brazil): *p*, Style, connective, and paraphysis, from dorsal view; *q*, apical portion of forewing; *r*, basalmost teeth of second valvula.

veins not elevated, indistinct on basal portion of wing, with four apical cells of which base of the fourth is more proximal than base of third, with three closed anteapical cells, the outermost very narrow, without an anteapical plexus of veins, texture coriaceous; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel longitudinal rows of very small setae on plantar surface.

Male pygofer well produced and with numerous macrosetae on apical half, with or without a process (arising dorsally when present). Plates short, triangular, not extending posteriorly nearly as far as pygofer apex, each with uniseriate macrosetae. Style truncate apically, extending posteriorly approximately as far as apex of connective. Connective Y-shaped with arms widely divergent. Aedeagus with apical processes that vary interspecifically. Paraphyses variable interspecifically.

Female abdominal sternum VII moderately produced, posterior margin rectilinear and transverse on each side of a short median triangular projection.

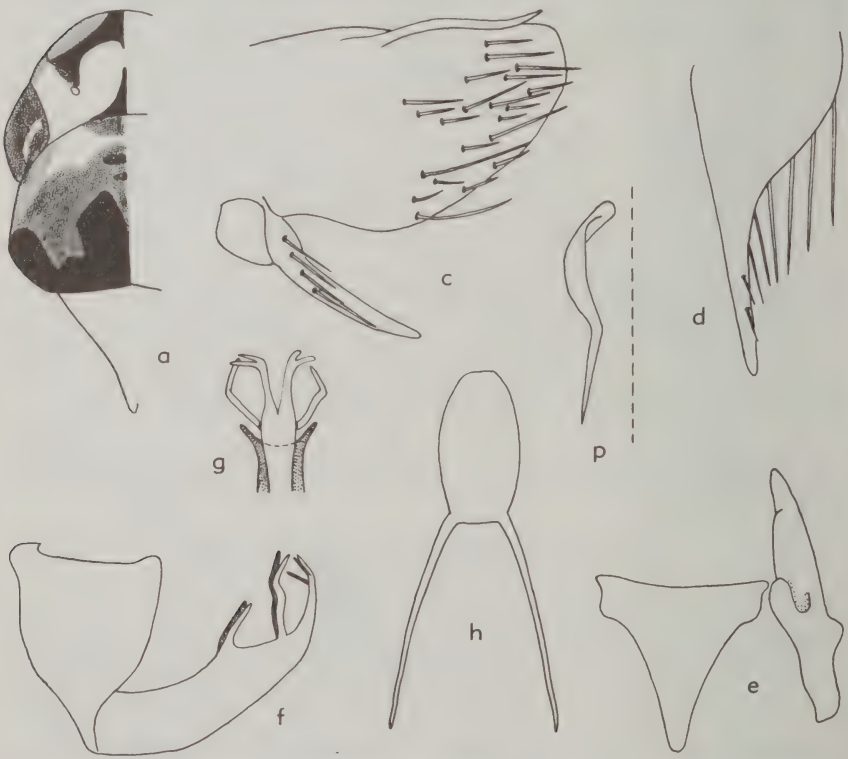


FIGURE 869.—*Catagonalia conjunctula* (Osborn) (*a* from specimen from Mato Grosso, Brazil; remainder from Las Juntas, Bolivia; only apex of aedeagus shown in *g; h* from caudoventral view): *p,* Pygofer process, left side, from dorsal view.

Dorsal wall of genital chamber without sclerites. Ovipositor very long, exceeding apex of pygofer; second valvulae each broadened beyond basal curvature, with small widely spaced quadrate primary teeth at base of broad portion, becoming more closely spaced and broader and with minute secondary denticles nearer apex, with anteapical dorsal denticles, apex acute. Pygofer with macrosetae irregularly arranged on apical half.

Species of *Catagonalia* Evans are predominantly green, occasionally suffused with blue, with the crown orange and bearing markings which are variable interspecifically.

The range of *Catagonalia* Evans is from Colombia to Bolivia and Brazil.

Catagonalia Evans is similar in appearance, and in the form of the second valvulae of the ovipositor, to *Lautereria*, new genus, and to *Tantogonalia*, new genus. *Catagonalia* and *Tantogonalia* females lack the lobe of the first valvifer of the ovipositor present in *Lautereria*; differences in males are discussed in the treatment of *Tantogonalia*.

My interpretation of *Cicadella conjunctula* Osborn is based on a female specimen from Chapada, Brazil, labeled "Type", in the Carnegie Museum. I have identified *Tettigonia lunata* Signoret in the sense of Signoret's original illustration (1854b, pl. 11, fig. 13). This agrees with the head markings of the only specimen from the Signoret collection in NMV, a specimen which lacks both pairs of wings, the abdomen, and the hindlegs (I did not select it as lectotype in the hope that a better specimen may be found in the Spinola collection). In a specimen from Yurac, Peru, the most apical of the aedeagal processes is not branched as in the specimen illustrated here (Fig. 869*g*). My interpretation of *Tettigoniella coronula* Jacobi is based on the male lectotype in SMT.

SPECIES OF *CATAGONALIA*

conjunctula (Osborn), 1926b:193 (*Cicadella*). Colombia, Bolivia, Brazil. New combination.

lunata (Signoret), 1854b:349 (*Tettigonia*). Ecuador, Peru, Bolivia, Brazil.

coronula (Jacobi), 1905c:185 (*Tettigoniella*). New synonymy.

KEY TO SPECIES OF *CATAGONALIA*

Crown with an anterior submarginal band of ivory bordered with black ..... *lunata* (Signoret) (fig. 868)

Crown with an apical marginal black spot and a black spot before each ocellus ..... *conjunctula* (Osborn) (fig. 869)

147. TANTOGONALIA, NEW GENUS

FIGURES 870, 871

Type-species: *Tantogonalia praecalva,* new species.

Length 7.6-9.1 mm.

Head moderately produced, median length of crown from slightly less than six-tenths to eight-tenths interocular width and from slightly more than four-tenths to slightly more than one-half transocular width, with anterior margin elevated and convex at transition from crown to face, ocelli located before a

line between anterior eye angles, each equidistant from median line of crown and adjacent anterior eye angle or slightly closer to latter, crown without a transverse concavity across ocelli, without a median fovea, and without sculpturing other than muscle impressions; lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant in dorsal view, in lateral view with anterior margins oblique and convex; clypeus convex, muscle impressions distinct, transclypeal suture not complete, clypellus in profile with its lower portion more nearly horizontal than remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin shallowly concave, disk without sculpturing or setae; scutellum without sculpturing behind transverse sulcus. Forewing without a membrane (but dark apically, see color descriptions below), veins distinct, with three closed anteapical cells of which bases of at least outer two are proximal to claval apex, and four apical cells, the base of the fourth not or only slightly more proximal than base of third, without an anteapical plexus of veins, texture opaque. Hindlegs with femoral setal formula 2:1:1, length of first tarsomere equal to or slightly greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer well produced, with an apical process, posterior margin and chaetotaxy variable interspecifically. Plates slender, triangular, extending posteriorly as far as pygofer apex, each with numerous uniseriate macrosetae. Style extending posteriorly to a variable degree in relation to apex of connective, with a distinct lobe at midlength, apex obliquely truncate. Connective Y-shaped with arms widely divergent. Aedeagus variable interspecifically, with at least two apical processes. Paraphyses absent.

Female abdominal sternum VII moderately produced with posterior margin broadly convex. Genital chamber without sclerites. Ovipositor without a posteroventral lobe on first valvifer; second valvulae as in *Catagonalia* Evans. Pygofer as in *Catagonalia* (fig. 868*j*).

Species of *Tantogonalia*, new genus, are dark green or bluish-green with the crown orange or dull yellow and with black markings on crown and face.

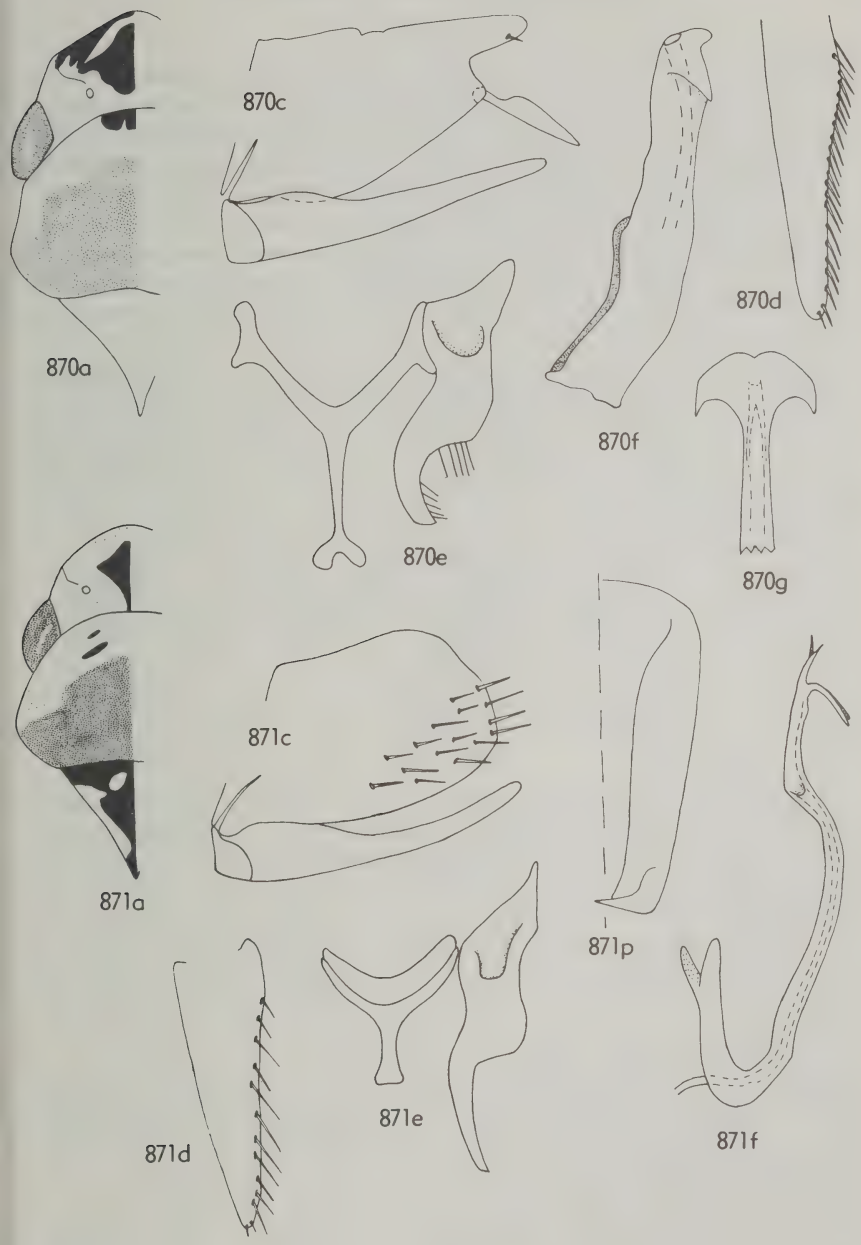
The range of *Tantogonalia* is Colombia and Paraguay. *Tantogonalia* is related to *Catagonalia* Evans and *Lautereria*, new genus. The males lack the basidorsal pygofer process of *Lautereria*; and the females lack the posteroventral valvifer lobe found in the last. *Catagonalia* males have at least vestiges of paraphyses, which are absent in males of *Tantogonalia* and the setae of the plates are less numerous than in *Tantogonalia*.

SPECIES OF *TANTOGONALIA*

lateralis, n. sp. Paraguay.
praecalva, n. sp. Colombia, Paraguay.

KEY TO SPECIES OF *TANTOGONALIA*

Crown with ground color orange, scutellum heavily marked with black; male pygofer not lobate apically ..... *lateralis*, n. sp., page 1074
Crown with ground color dull yellow, scutellum dull yellow, unmarked; male pygofer with apex bilobate ..... *praecalva*, n. sp., page 1074



FIGURES 870, 871.—870, *Tantogonalia praecalva,* n. sp., holotype (only aedeagal apex shown in *g*). 871, *T. lateralis*, n. sp., holotype: *p,* Male pygofer, left side, from ventral view.

Tantogonalia lateralis, NEW SPECIES

FIGURE 871

Length 8.3-9.2 mm. Head with median length of crown from slightly more than six-tenths to more than seven-tenths interocular width and from slightly more than four-tenths to slightly more than one-half transocular width, ocelli each slightly closer to adjacent anterior eye angle than to median line of crown. Male pygofer almost regularly convex posteriorly in lateral view, in ventral view with a very short apical process directed mesad, macrosetae fairly numerous compared to *T. praecalva*, n. sp., located parallel to posteroventral margin; style extending posteriorly beyond apex of connective; aedeagus long, slender with two pairs of slender acute apical processes, gonopore anteapical and lateral.

Ground color of crown, anterior portion of pronotum, and scutellum, orange, crown with a diamond-shaped median black spot, scutellum heavily and variably marked with black, remainder of pronotum and forewings bluish-green except broad apical margins of wings which are black; face orange except most of clypeus and base of clypellus which are black; thoracic pleura and legs orange.

Holotype male, Paraguay; one male and two females, "Rio Aguatal", Paraguay; one female, "Villa Elvira", Paraguay (MMB).

T. lateralis, n. sp. is readily separable from *T. praecalva*, n. sp., by its orange crown and face, and by the form of the male pygofer and aedeagus.

Tantogonalia praecalva, NEW SPECIES

FIGURE 870

Length 8.3-8.7 mm. Head with median length of crown from six-tenths to two-thirds interocular width and from slightly more than four-tenths to one-half transocular width, ocelli each approximately equidistant from median line of crown and adjacent anterior eye angle. Male pygofer with an apical concavity in lateral view, the resulting dorsal lobe longer than the ventral one, with a flat process arising from the ventral lobe and extending posteroventrally, with one macroseta near apex of dorsal lobe; aedeagus shorter and broader than in *T. lateralis*, n. sp., with a pair of broad apical processes, gonopore terminal.

Crown greenish-yellow with a large black spot on disk and anterolateral margins black; anterior portion of pronotum and scutellum yellow to orange-yellow, remainder of pronotum and forewings dull green with an apical black border on forewings as in *lateralis;* clypeus mostly black, remainder of face and thoracic pleura and legs yellow.

Holotype male and one female, Palmira, Antioquia, Colombia, August 5, 1955 (A. Saldarriaga), on coffee (RFC). One female, "Rio Aguatal", [Paraguay?] (MMB). Holotype in USNM.

Distinguishing characters of *T. praecalva* are discussed above in the description of *T. lateralis,* n. sp.

148. LANEOLA, NEW GENUS

FIGURE 872

Type-species: *Tettigonia rubricauda* Signoret (1854b:351).

Length 5.9-6.7 mm.

Head moderately produced with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly more than one-half to slightly more than six-tenths interocular width, and from slightly more than one-third to slightly more than four-tenths transocular width, without a carina at transition from crown to face, ocelli located on a line between anterior eye angles, each approximately equidistant from median line of crown and adjacent anterior eye angle, crown without a transverse concavity and without a median fovea, surface without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and slightly convex; clypeus slightly convex, muscle impressions not very distinct, clypellus with contour continuing profile of clypeus.

Thorax with pronotal width equal to or less than transocular width of head, lateral margins almost parallel, dorsopleural carinae complete, posterior

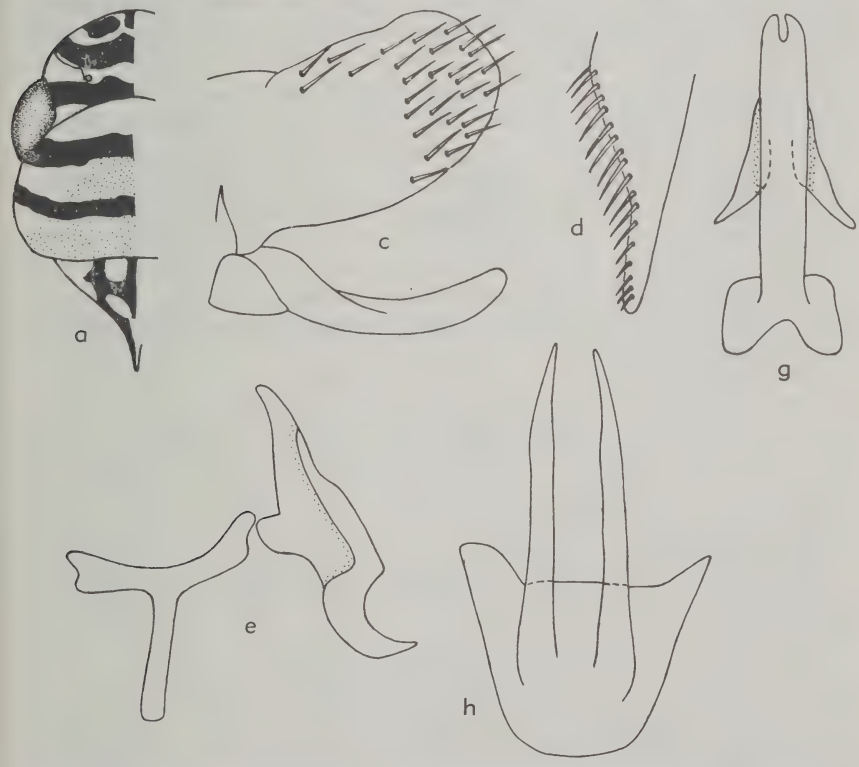


FIGURE 872.—*Laneola rubricauda* (Signoret) (from specimen from Minas Gerais, Brazil; *h* from caudal view).

margin shallowly concave, disk without sculpturing, not pubescent; scutellum not striate behind transverse sulcus. Forewing without a membrane, veins contrastingly black, with three anteapical cells of which base of innermost is distal to claval apex, base of middle one varying from distal to proximal to claval apex, and base of outermost proximal to claval apex; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced with posterior margin broadly convex, with numerous macrosetae on posterior half; pygofer processes absent. Plates triangular, tapering gradually, not extending posteriorly as far as pygofer apex, each with uniseriate macrosetae. Style extending posteriorly as far as apex of connective, acute apically. Aedeagus with basal apodemes shorter than shaft which extends posterodorsally and bears a pair of lateral tapering retrorse anteapical processes. Paraphyses biramous, symmetrical.

Female abdominal sternum VII moderately produced and angular at apex; second valvulae of ovipositor narrow, each with ventral margin very slightly convex, bearing widely-spaced sloping teeth on dorsal margin beyond basal curvature, the teeth slightly closer together near apex, with minute secondary denticles located between the teeth but not posterodorsally nor posteroventrally before the very acute apex.

Laneola, new genus, is known only from the type-species of which I have seen specimens from Minas Gerais and Rio de Janeiro, Brazil. *Laneola* is similar in the second valvulae of the ovipositor and in some features of the male genitalia, to *Tlagonalia,* new genus, but it is doubtful that any close phyletic relationship exists. The type-species is a beautiful green species with black lines on the crown and face and black veins on the forewings to their apical orange band.

I am pleased to name this genus in honor of the late Dr. John Lane, well-known dipterist from São Paulo whose collections have been helpful in the course of this study.

149. CIBRA, NEW GENUS

FIGURE 873

Type-species: *Cibra acuta,* new species.

Length 6.4-6.9 mm.

Head well produced, anterior margin acutely angular in dorsal view, median length of crown slightly less than interocular width and varying from slightly more than one-half to six-tenths transocular width, without a carina at transition from crown to face, ocelli on or slightly before a line between anterior eye angles, each equidistant from median line and adjacent anterior eye angle or slightly closer to latter, crown without a concavity on disk, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins vertical; face without a vertical lenticular sclerite bordering lateral

clypeal suture on each side below eye, clypeus flattened medially, muscle impressions distinct, transclypeal suture obsolete at middle, clypellus not produced, contour of its basal portion continuing profile of clypeus, its apical portion more nearly parallel to transverse median plane.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, posterior margin slightly concave, disk transversely rugose, without pubescence; scutellum not transversely striate behind transverse sulcus. Forewing with membrane including all of inner apical cell and apical portion of second apical cell, extent of anteapical cells obscured by supernumerary crossveins, with four apical cells, the base of the fourth more proximal than base of third; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 or 2:1:0; length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer moderately produced, dorsoapical margin narrowly rounded, with very numerous, close-set short macrosetae on apical half, pygofer processes absent. Plates slender and elongate, extending posteriorly beyond pygofer apex, without macrosetae; in lateral view with apices curved abruptly dorsad and acute, each with numerous fine elongate microsetae on dorsal margin. Style extending posteriorly much farther than apex of connective, acute apically, without preapical lobe. Connective Y-shaped, with stem approximately as long as arms. Aedeagus short, with elongate dorsal apodemes, shaft curved gradually dorsad, without processes. Paraphyses absent.

Female abdominal sternum VII moderately produced, with posterior margin obtusely angulate. Genital chamber without sclerites. Ovipositor with second valvulae each broad beyond basal curvature, with teeth quadrate, bearing secondary denticles, and widely spaced near base, more closely set near apex; with anteapical dorsal denticles; apex acute. Pygofer with a few macrosetae before posterodorsal margin, a sparse row of very small setae along posteroventral margin, and an oblique row of larger setae near the base, the row appearing as an adjacent fringe to sternum VII in dried specimens.

Cibra, new genus, is known only from the type-species which occurs in the islands of Dominica and Antigua, both in B. W. I. The genus is similar to *Draeculacephala* Ball in appearance, but without paraphyses in the male, and with a number of other distinctive characters including the densely setose male pygofer and the chaetotaxy of the female pygofer. I have placed it close to *Hadria* Metcalf and Bruner solely on the similarity of the female pygofer to that of *H. balloui* Metcalf and Bruner (fig. 786*j*).

Cibra acuta, NEW SPECIES

FIGURE 873

Length of male 6.4-6.5 mm, of female 6.8-6.9 mm. Other morphological characters as in generic description. Ground color of crown, anterior portion of pronotum, and scutellum, dull yellow, posterior two-thirds of pronotum

and forewings except membrane dark green; crown with an anterior marginal black line, with a parallel oblique black line on each side passing around ocellus, extending anteromesally and connecting before midline with one of a pair of longitudinal lines that extend posteriorly almost to posterior margin of crown, with a black spot bordering posterior margin on each side posteromesad of ocelli; scutellum with median line narrowly black to transverse sulcus which is narrowly black, with a circular black spot on each side of median line and an angular spot on each side bordering posterior margin of pronotum; face, venter, and legs, yellowish green, with a short black line on propleura at level of dorsopleural carina.

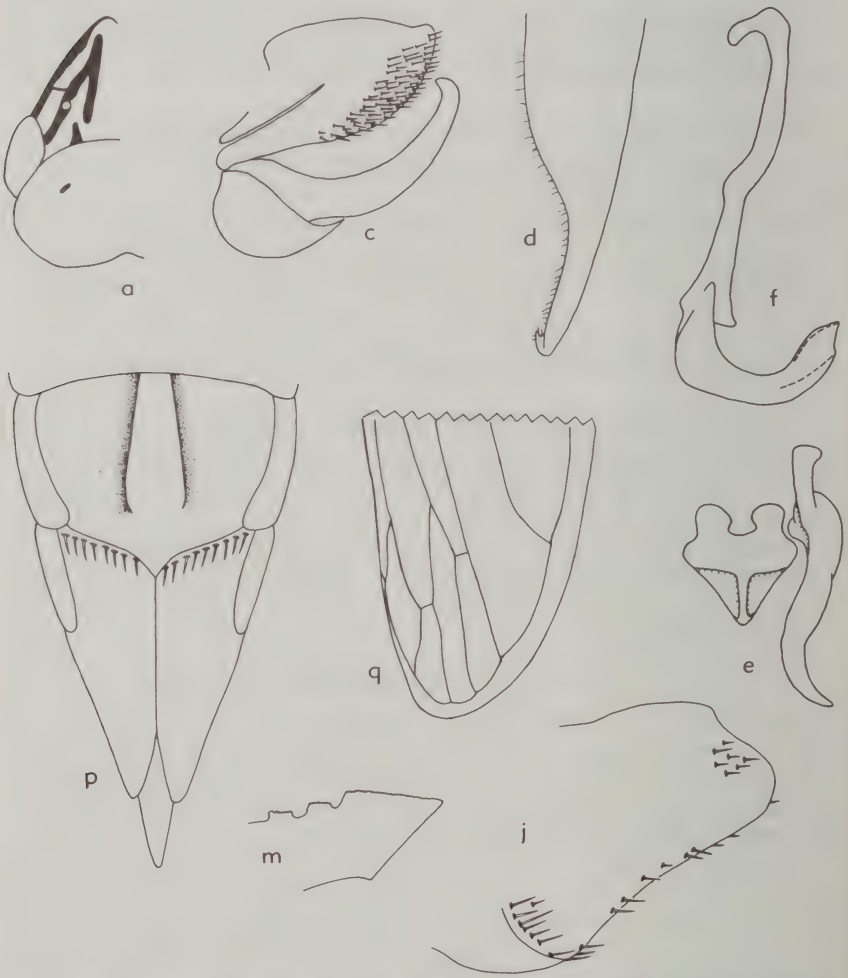


FIGURE 873.—*Cibra acuta,* n. sp. (*a, c-f,* from holotype; remainder from specimen from Dominican Republic): *p,* Abdominal apex, female, from ventral view; *q,* apex of hindwing.

Holotype and one additional male, Dominica, B. W. I., forest 800 m., June 15, 1941 (R. G. Fennah), two females, Dominica (R. G. Fennah), one female, Antigua, B. W. I., English Harbor, April 4, 1956 (J. F. G. Clarke) in USNM.

150. VIDANOANA, NEW GENUS

FIGURE 874

Type-species: *Tettigonia flavomaculata* Blanchard.

Length of male 5.3-5.7 mm, of female 6.0-6.2 mm.

Head moderately produced, median length of crown varying from two-thirds to slightly more than seven-tenths interocular width and between four- and five-tenths transocular width, anterior margin narrowly rounded in dorsal view, without a carina at transition from crown to face, ocelli located before a line between anterior eye angles, each closer to median line than to adjacent anterior eye angle, crown without a transverse concavity or a median fovea, surface finely and regularly punctate, lateral clypeal sutures extending onto crown, but not extending to or near ocelli; antennal ledges not protuberant, in lateral view with anterior margins convex; clypeus convex, muscle impressions not distinct, transclypeal suture obsolete at middle, clypellus not produced, the contour of its apical portion more nearly horizontal than profile of remainder of face.

Thorax with pronotal width greater than transocular width of head, lateral margins convergent anteriorly, dorsopleural carinae complete, posterior margin concave, disk transversely rugose, not pubescent; scutellum transversely rugose in its posterior half. Forewing with membrane including inner three apical cells, veins not elevated, indistinct except at apex, with two anteapical cells of which the outermost is open basally, with four apical cells, without an anteapical plexus of veins, texture coriaceous except a broad translucent area bordering costal margin; forewings of female in rest position exceeding apex of ovipositor. Hindwing with marginal vein at wing apex. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer weakly produced, with apical margin truncate, texture membranous in middle of disk, completely without setae. Plates elongate, triangular, fused basally, extending posteriorly beyond apex of pygofer, without setae. Style extending posteriorly beyond apex of connective, acute apically, without preapical lobe, with ventral denticles through more than apical half of length. Connective narrowly Y-shaped. Aedeagus simple, fused with apex of connective, shaft tapering, curved dorsally and anteriorly, without processes.

Female abdominal sternum VII not strongly produced, posterior margin with a deep narrow median notch. Genital chamber without sclerites. Ovipositor with second valvulae expanded beyond basal curvature, with widely spaced triangular teeth at base and larger, quadrate, sloping primary teeth at apical part of expanded portion, each bearing minute secondary denticles, with numerous anteapical dorsal denticles.

Vidanoana, new genus, is known only from the type-species, of which I have seen specimens from several Chilean localities slightly south of the 35th parallel. *Vidanoana* stands apart from the other genera of Cicadellinae in that the apical part of marginal vein of the hindwing coincides with the wing apex (fig. 874*t*), in that the aedeagus and connective are fused, in the lack of setae on male pygofer and plates, and in the flexible area on the disk of the male pygofer. I have seen the last only in Old World genera, but I have nevertheless not been able to associate *Vidanoana* more closely with Old World genera than with New World ones.

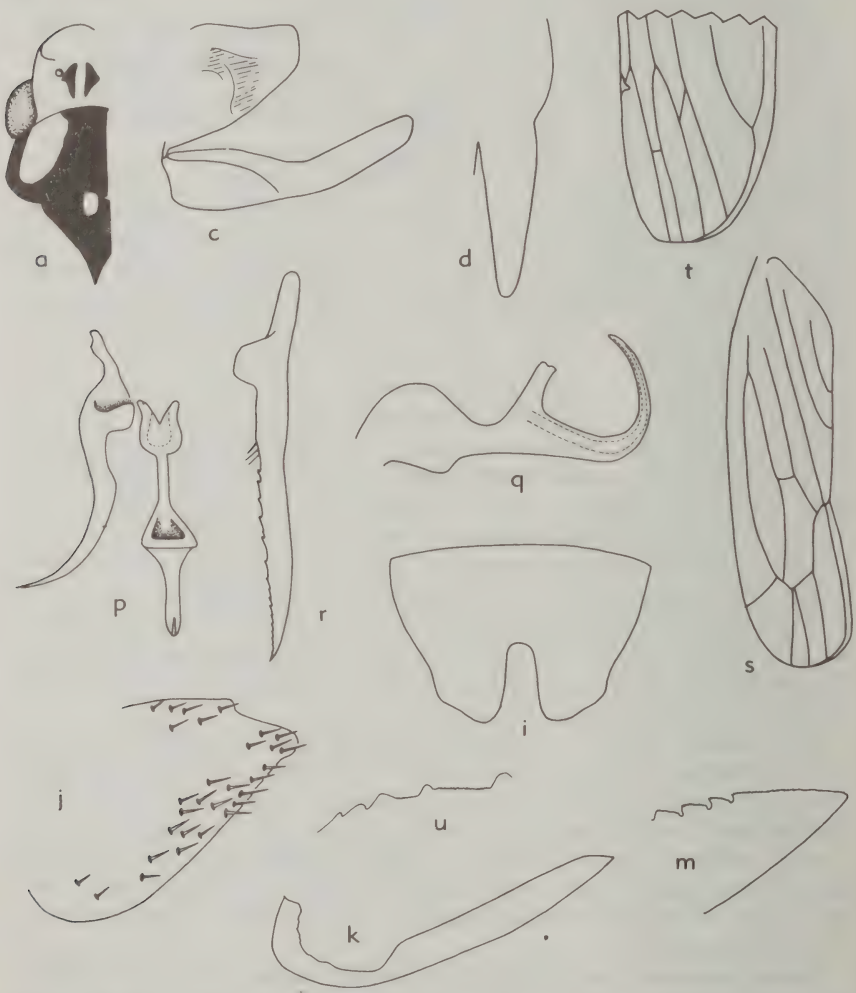


FIGURE 874.—*Vidanoana flavomaculata* (Blanchard) (from specimens from Chiloe, Chile): *p,* Style, connective, and aedeagus, from dorsal view; *q,* aedeagus and connective, from lateral view; *r,* style from lateral view; *s,* forewing; *t,* hindwing apex; *u,* basalmost teeth of second valvula.

My identification of the type-species is based on the original description, and specimens determined by Dr. James P. Kramer. I have not seen specimens determined as *Tettigonia fenestrata* Signoret, but his illustration (1854a: plate I, fig. 7) leaves little doubt that earlier authors were correct in placing *fenestrata* in synonymy.

SPECIES OF *VIDANOANA*

flavomaculata (Blanchard) *in* Spinola, 1852a:282 (*Tettigonia*). Central Chile. New combination.

fenestrata (Signoret), 1854a:9 (*Tettigonia*).

151. Genus EHAGUA Melichar

Figures 875, 876

Ehagua Melichar, 1926a:345. **Type-species:** *Cicadella dubiosa* Dozier, by present designation.

Length 9.1-11.9 mm.

Head moderately produced, anterior margin narrowly rounded to angulate in dorsal view, median length of crown from slightly less than three-fourths to nine-tenths interocular width, and from four-tenths to one-half transocular width, without a carina at transition from crown to face, ocelli located before or behind a line between anterior eye angles (varying interspecifically), crown with disk concave, usually without sculpturing except muscle impressions, without setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges slightly protuberant, with anterior margins oblique and either rectilinear or convex; clypeus concave medially, muscle impressions distinct or not, transclypeal suture obsolete at middle, clypellus not produced, but with its lower portion more nearly parallel to longitudinal axis of body than remainder of face.

Thorax with pronotal width less than transocular width of crown, lateral margins parallel, dorsopleural carinae complete, posterior margin slightly concave, disk transversely rugose; scutellum not or weakly rugose behind transverse sulcus. Forewing with membrane including at least inner apical cell and part of adjoining second apical cell, with three closed anteapical cells which have their bases approximately in the same transverse line, with four apical cells, the base of the fourth more proximal than base of third, without an anteapical plexus of veins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1, length of first tarsomere equal to length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer slender and well-produced, apex narrowly rounded or angulate with few (*E. dubiosa* (Dozier)) to many (*cruenta* (Gmelin)) setae in multiseriate group parallel to posteroventral margin; without pygofer processes. Plates slender, triangular, not extending posteriorly nearly as far as pygofer apex, with or without uniseriate macrosetae. Style extending posteriorly farther than apex of connective, truncate apically. Connective with

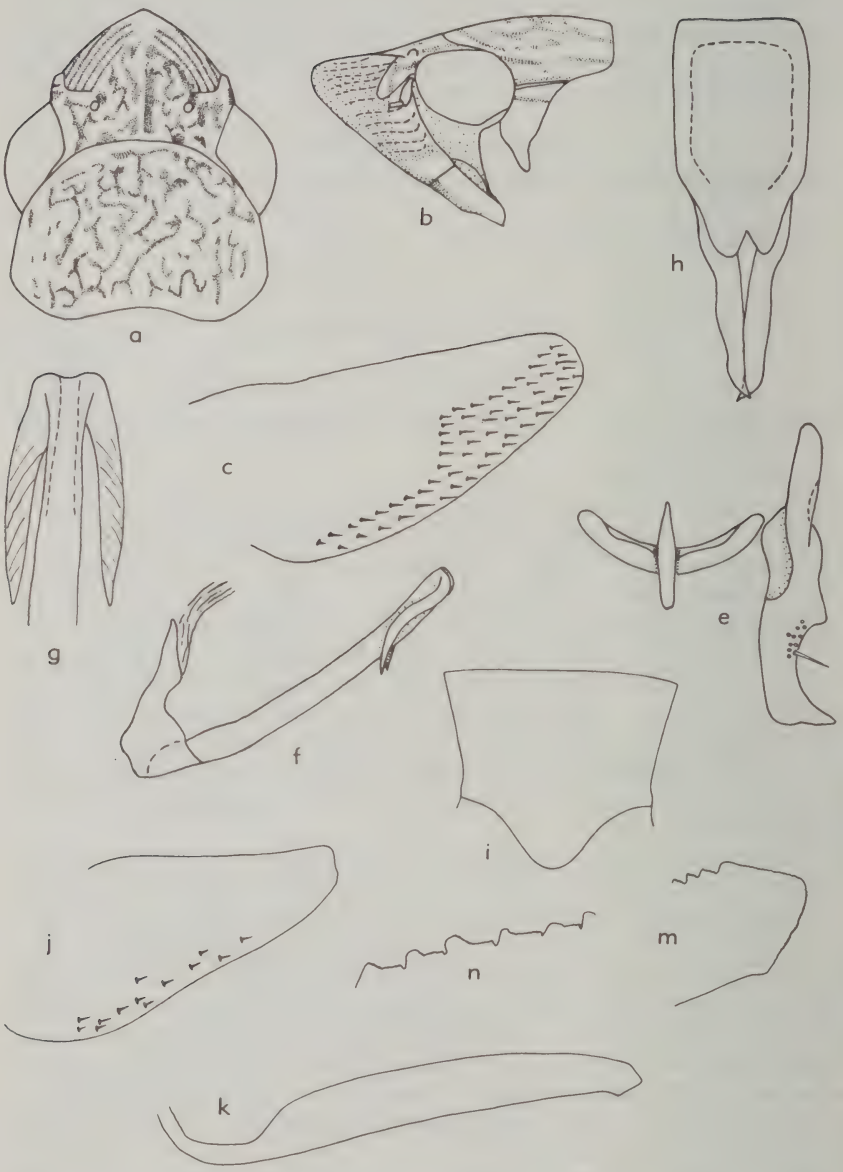


FIGURE 875.—*Ehagua cruenta* (Gmelin) (*i* from lectotype of *Tapajosa rufipennis* Melichar; *i-k, m, n,* from specimen from Worthy Park, Jamaica; remainder from St. Andrew, Jamaica; plate not shown in *c;* only apical portion of aedeagus shown in *g; h* from ventral view).

stem not longer than arms which are widely divergent. Aedeagus elongate and with apical or anteapical paired lateral processes. Paraphyses present or absent (*dubiosa*).

Female abdominal sternum VII with posterior margin produced posteriorly and strongly and regularly convex or narrowly notched on posterior margin. Genital chamber without sclerites. Ovipositor with second valvulae each broad beyond basal curvature and with convex primary teeth, with numerous denticles on posterior margins of primaries and on areas between primaries; apices rather blunt, rounded, with minute anteapical dorsal and ventral denticles. Pygofer slender and strongly produced, with a few short multiseriate setae parallel to ventral margin.

Specimens of *Ehagua* Melichar are yellow to yellowish-green on anterior dorsum, with black markings or vermiculations; forewing with at least some dull red suffusion; face and thoracic pleura dull yellow with few dark markings. I have seen specimens from Jamaica, Haiti, and the Dominican Republic.

My interpretation of *Ehagua dubiosa* (Dozier) is based on specimens in USNM from Haiti and the Dominican Republic. It agrees with a specimen in the MMB labeled "*Ehagua polita*," probably by Melichar, but this is a *nomen nudum*. I have interpreted *Tapajosa rufipennis* Melichar in accordance with the female lectotype.

I have been unable to find close relationships between *Ehagua* and other genera included in this work.

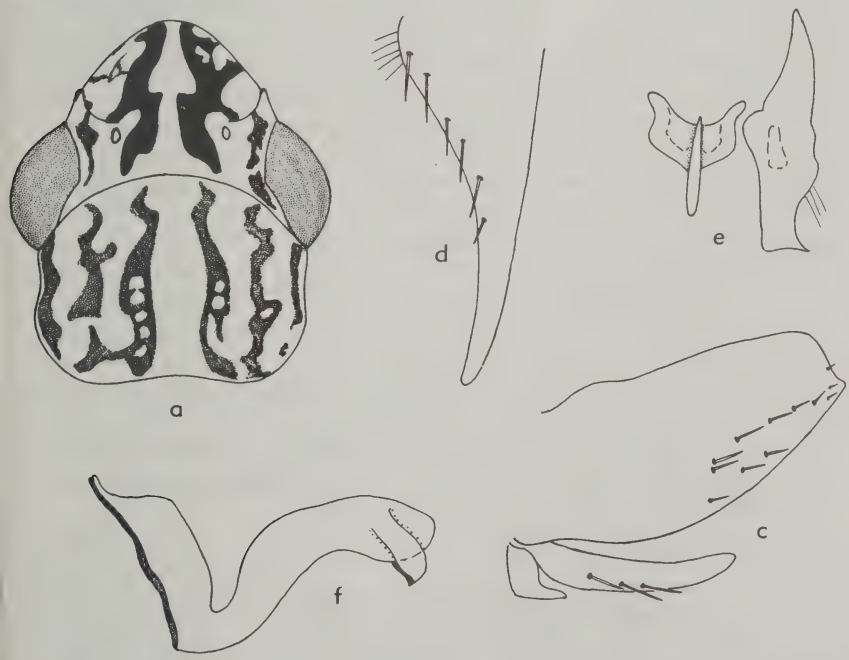


FIGURE 876.—*Ehagua dubiosa* (Dozier) (from specimen from Haiti).

SPECIES OF *EHAGUA*

cruenta (Gmelin), 1789a:2109 (*Cicada*) (new name). Jamaica. New combination.
sanguinea (Drury), 1773a:73 (*Cicada*) (preoccupied).
rufipennis (Melichar), 1924a:243 (*Tapajosa*). New synonymy.
druryi (Metcalf) (new name for *sanguinea* Drury), 1955a:264 (*Tettigella*).
dubiosa (Dozier), 1931a:5 (*Cicadella*). Haiti, Dominican Republic. New combination.

KEY TO SPECIES OF *EHAGUA*

Ocelli located in front of a line between anterior eye angles; male plates without macrosetae; paraphyses present ..... *cruenta* (Gmelin) (fig. 875)
Ocelli located behind a line between anterior eye angles; male plates with with uniseriate macrosetae; paraphyses absent .. *dubiosa* (Dozier) (fig. 876)

152. SONESIMIA, NEW GENUS

FIGURES 877-880

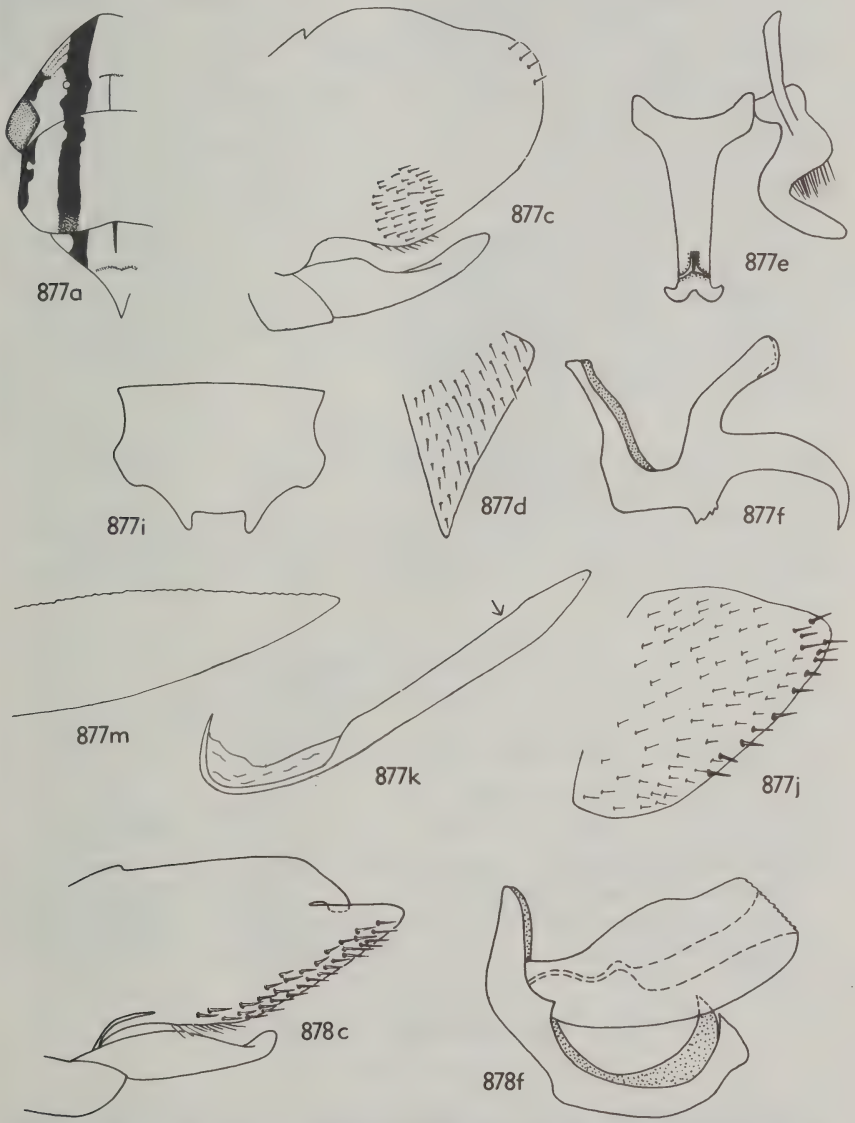
Type-species: *Tettigonia grossa* Signoret.
Length 9.9-13.7 mm.

Head moderately produced, its median length from one-half to eight-tenths interocular width and from one-third to slightly more than four-tenths transocular width, anterior margin rounded in dorsal aspect, without a carina at transition from crown to face, ocelli located on line between anterior eye angles and variable in location with respect to latter, surface of crown slightly convex to concave medially and always concave in ocellocular region, without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledge with anterior margin concave in lateral aspect; face convex, with fine pubescence at apex of clypellus, muscle impressions usually distinct, transclypeal suture obscure medially, clypellus strongly convex.

Thorax with pronotal width variable in relation to transocular width of head, lateral margins parallel or divergent posteriorly, dorsopleural carina incomplete, posterior margin concave, disk transversely rugose, without pubescence; posterior portion of scutellum not striate. Forewing with membrane including inner apical cell and usually apical portions of remaining apical cells, veins distinct and usually elevated, inner two anteapical cells usually open basally, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins; forewings of female exceeding apex of ovipositor in rest position. Hindleg with femoral setal formula 2:0:0, 2:1:0, or 2:1:1, tibiae scarcely flattened with setal rows 1 and 2 both irregularly spaced and both containing intercalary microsetae, first tarsomere with length subequal to combined length of more distal tarsomeres, with numerous setae which are not seriate.

Male genitalia: Pygofer moderately produced posteriorly or posterodorsally and rounded apically, with numerous small macrosetae on ventral half of disk, or on apical submarginal portion, or in a group on ventral portion of disk, with or without processes which are located apically or dorsally and anteapically when present. Plates not extending as far posteriorly as pygofer apex, fused and very broad basally, extending laterally beyond pygofer, lateral margins strongly convex, each plate with numerous regularly dispersed

microsetae. Style variable in length with relation to length of connective, with or without preapical lobe, curved gradually or abruptly laterally in apical portion. Connective Y-shaped with arms widely divergent and stem much longer than arms, carinate only on apical portion. Aedeagus symmetrical with paired or unpaired processes arising ventrally near base. Paraphyses usually absent.



FIGURES 877, 878.—877, *Sonesimia grossa* (Signoret) (*i* from lectotype; *j, k, m,* from specimen from Santa Cruz, Bolivia; remainder from Misiones, Argentina; arrow in *k* indicates base of portion shown in *m*). 878, *S. chinai* (Costa Lima) (from specimen from southeastern Brazil).

Female abdominal sternum VII emarginate medially. Genital chamber with or without sclerites which are weak and poorly delimited when present. Ovipositor with second valvulae spear-shaped, without teeth, connected dorsally only by membrane. Pygofer short, covered with sparse microsetae except for a few macrosetae near posterior margin.

Sonesimia occurs only in southern Brazil, Paraguay, Argentina, and Bolivia. I have not been able to relate it closely to other genera. According to the original description, *S. chinai* (Costa Lima) feeds on millet and other plants.

There are a number of microsetae on the apical portion of the hind femur of several species of *Sonesimia*. Towards the apex of the femur these tend to become larger, and in some specimens they are not much smaller than those used in the femoral setal formula. The first valvulae of the female of *S. grandis* (Walker) are peculiar in that they have a process which extends laterally.

The identity of *Tettigonia grandis* Walker rests on a male specimen compared with the lectotype. Taschenberg's *T. crucigera* is synonymized as a result of a dissection of the holotype. The present interpretation of *S. grossa* (Signoret) is based on a male which agrees with Signoret's original illustrations. The identity of *S. chinai* (Costa Lima) rests on my determination from the original description.

SPECIES OF *SONESIMIA*

chinai (Costa Lima), 1963a:121 (*Apogonalia*). SE. Brazil. New combination.
dimidiata, n. sp. S. Brazil, Argentina.
grandis (Walker), 1851b:745 (*Tettigonia*). S. Brazil, Paraguay. New combination.
crucigera (Taschenberg), 1884a:437 (*Tettigonia*). New synonymy.
grossa (Signoret), 1854a:25 (*Tettigonia*). Bolivia, S. Brazil, Paraguay, Argentina. New combination.

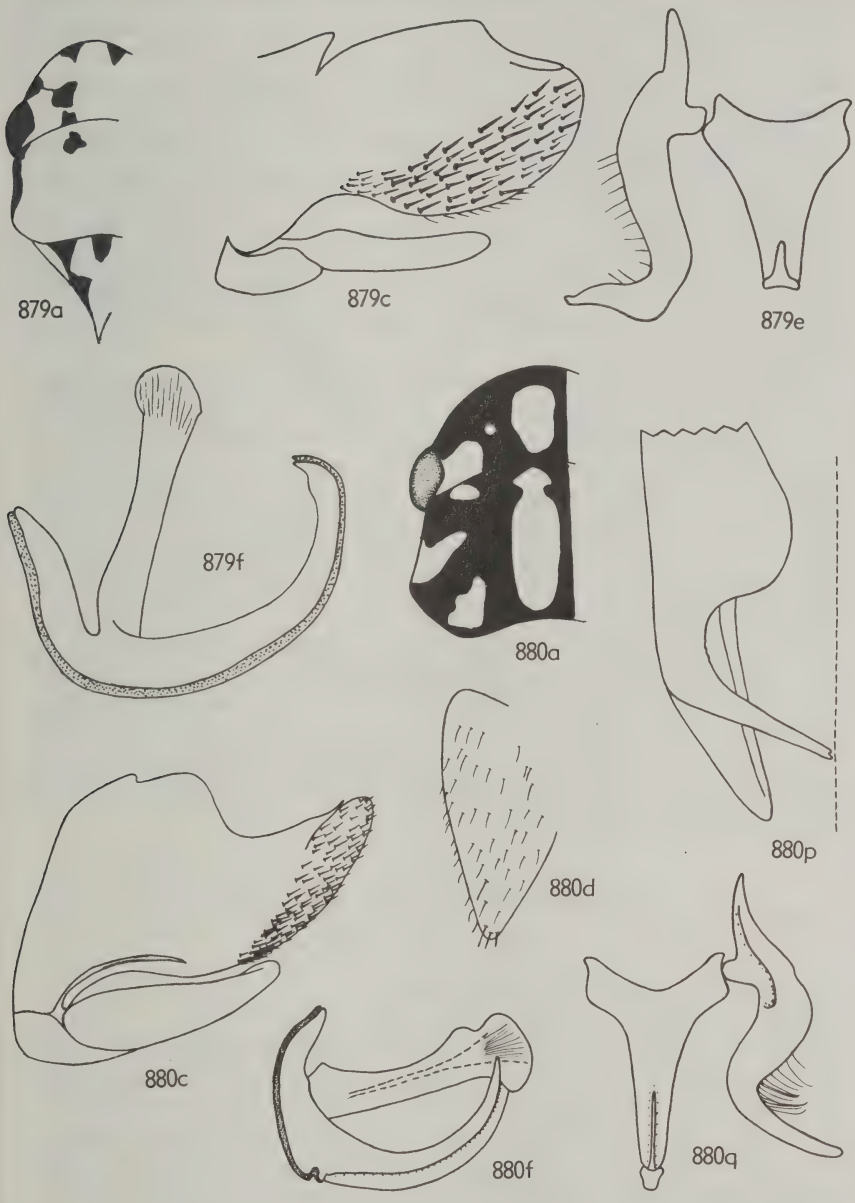
KEY TO SPECIES OF *SONESIMIA*

1. Head with transocular width greater than pronotal width ..... *grossa* (Signoret) (fig. 877)
   Head with transocular width less than pronotal width 2
2. Face with a median black stripe 3
   Face without a median black stripe ..... *dimidiata*, n. sp.
3. Male with aedeagal shaft concave dorsally through most of length, pygofer not attenuate apically ..... *grandis* (Walker) (fig. 880)
   Male with aedeagal shaft convex dorsally through most of length, pygofer attenuate apically ..... *chinai* (Costa Lima) (fig. 878)

Sonesimia dimidiata, NEW SPECIES

FIGURE 879

Length of male 13.0-13.7 mm, of female 9.5-10.5 mm. Head with median length from slightly more than half to more than six-tenths interocular width and four-tenths or slightly more than four-tenths transocular width, ocelli each closer to adjacent anterior eye angle than to median line of crown, medioposterior portion of disk slightly concave. Pronotum with width greater



FIGURES 879, 880.—879, *Sonesimia dimidiata,* n. sp. (from specimen from Misiones, Argentina). 880, *S. grandis* (Walker) (from specimen from Petropolis, Brazil): *p,* Male pygofer, left side, from dorsal view; *q,* style, connective, and vestigial paraphysis, from dorsal view.

than transocular width of crown, lateral margins divergent posteriorly; forewing with membrane including only inner apical cell; middle anteapical cell usually, and inner anteapical cell occasionally open basally; hind femoral setal formula 2:0:0 or 2:1:0. Male with pygofer broadly rounded posteriorly, with numerous regularly dispersed macrosetae on ventral portion of posterior half, pygofer process arising dorsally and anteapically, short, extending posteriorly; style extending slightly further posteriorly than apex of connective, curved abruptly laterally at apex and gradually tapered in apical portion, without preapical lobe; aedeagus with pair of processes arising ventrally near base, curved gradually posteriorly and dorsally, each widened anteapically, shaft concave on both anterior and posterior margins. Female abdominal sternum VII very slightly concave on posterior margin. Other structural characters as in generic description.

Ground color of crown, pronotum and scutellum, yellow, an arcuate band at apex of crown, a lineal marginal marking astride suture before eye, an irregular area surrounding each ocellus, a spot behind each ocellus on posterior margin of head, lateral pronotal margins and a pair of spots on anterior portion of disk, three angular spots on base and two anteapical lateral spots on scutellum, black; forewings yellowish-orange, veins conspicuously paler, face with a broad transverse line across transclypeal suture, continuing more narrowly across genae and expanding at posterior genal margin, and a median longitudinal clypellar stripe, black.

Holotype male, Misiones, Argentina and a number of additional specimens of both sexes from Misiones and Corriente, Argentina in Museo de la Plata. A series from Santa Catharina, Brazil (NCS). Two specimens Rio Grande do Sul (BM).

S. dimidiata, n. sp., is related to *S. grandis* (Walker) from which it can be distinguished by its lack of longitudinal markings over crown and pronotum and by its abruptly curved styles.

153. VERSIGONALIA, NEW GENUS

FIGURES 881, 882

Type-species: *Tettigonia ruficauda* Walker.

Length of male 5.8-7.5 mm, of female 6.4-8.4 mm.

Head very slightly produced, with anterior margin broadly rounded in dorsal view, median length of crown varying from slightly less than one-half to almost six-tenths interocular width and from slightly more than one-fourth to slightly more than one-third transocular width, without a carina at transition from crown to face, ocelli located on or slightly behind a line between anterior eye angles, each ocellus approximately equidistant from median line and adjacent anterior eye angle, crown without a concavity across ocelli, slightly convex on each side of a shallow median longitudinal depression that extends forward slightly beyond ocelli, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges not protuberant, in lateral view with anterior margins oblique and convex; face without a vertical lenticular sclerite bordering lateral clypeal suture on each side below eye, clypeus flattened

medially, at least some of muscle impressions differentially colored; transclypeal suture obscure, clypellus not swollen, its contour continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae distinct and complete, or absent (varying interspecifically), posterior margin convex or concave (varying interspecifically), disk not sculptured, not pubescent; scutellum not transversely striate

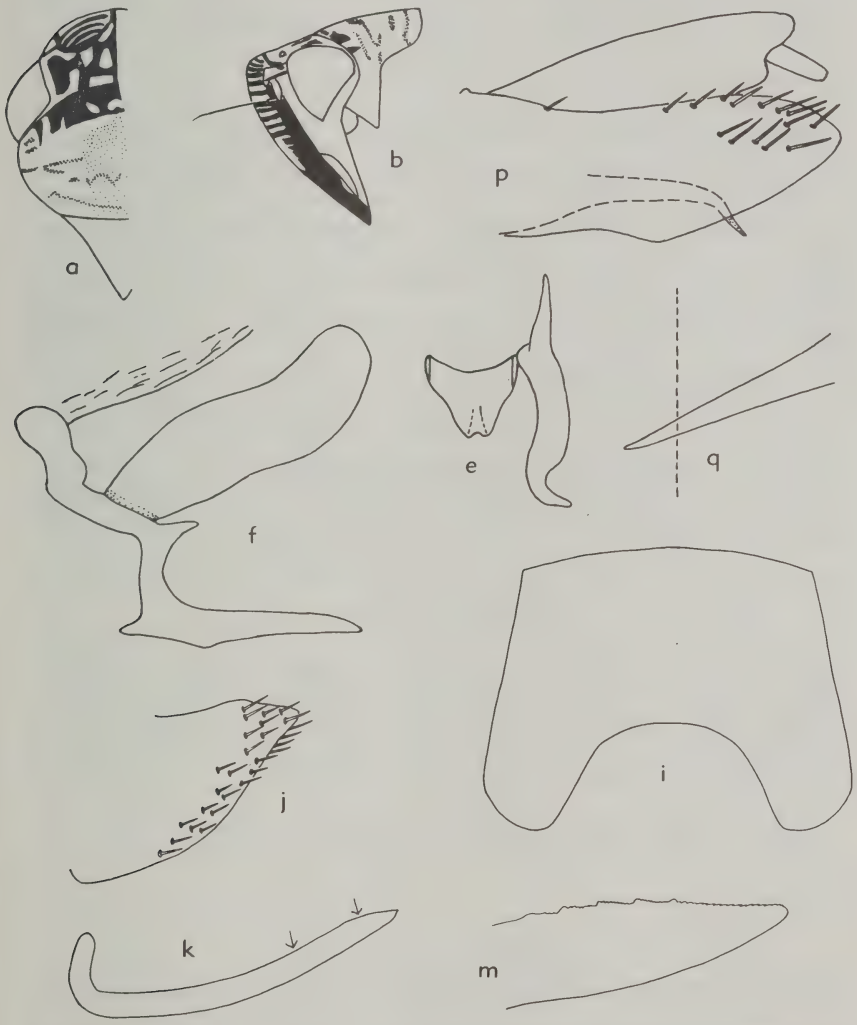


FIGURE 881.—*Versigonalia ruficauda* (Walker) (*a, b,* from specimen from Corrientes, Argentina; *i-k, m,* from Corupa, Brazil; remainder from Misiones, Argentina; arrows indicate extremities of toothed portion in *k*): *p,* Male pygofer and anal tube, from lateral view; *q,* left pygofer process, from ventral view.

behind transverse sulcus. Forewing with membrane sharply delimited, including apical cells in their entirety, or in part (varying intraspecifically), veins very indistinct except in teneral specimens, with three closed anteapical cells of which the bases are all proximal to a transverse line through claval apex, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins; forewing of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, and with two parallel rows of small setae on plantar surface.

Male genitalia: Pygofer strongly produced, apex varying from subangulate to broadly convex, with macrosetae on apical one-half or one-third, not arising in area parallel to ventral margin, pygofer processes differentially sclerotized, arising anteapically on mesal surface of pygofer, extending mesad across median line in some specimens. Plates elongate triangular, extending posteriorly approximately as far as pygofer apex, each with uniseriate macrosetae. Style extending posteriorly farther than apex of connective, narrowed and curved posterolaterally in its apical portion, narrowly rounded apically, without a distinct preapical lobe. Connective broadly Y-shaped, or U-shaped. Aedeagus with shaft broad and bisinuate, broadly rounded apically, with an unpaired basal sclerite which appears as a distinct ventral aedeagal process (*V. ruficauda* (Walker)) or as a paraphysis.

Female abdominal sternum VII truncate or regularly concave at apex. Dorsal membrane of genital chamber with or without a pair of sclerites. Ovipositor with second valvulae each not expanded near base, of nearly uniform width throughout length except at apex, with poorly developed primary teeth in apical one-third or one-half, the primaries bearing minute denticles, with numerous dorsal anteapical denticles, apex narrowly rounded, without a ventral anteapical angle. Pygofer with multiseriate macrosetae in a vertical group along posterior and posteroventral margin.

Specimens belonging to *Versigonalia* have been examined from southern Brazil and northern Argentina. Externally, the species of *Versigonalia* are very similar to those of *Macugonalia,* but the male plates are much longer and the abdominal sternum VII of the female is not produced in *Versigonalia*. The internal male genitalia of *Versigonalia* include a paraphysis which is lacking in *Macugonalia,* and the shape of the shaft of the aedeagus is quite different in the two genera.

Nothing is known of the biology of species of *Versigonalia*.

SPECIES OF *VERSIGONALIA*

ruficauda (Walker), 1851b:763 (*Tettigonia*). S. Brazil, N. Argentina. New combination.

consularis (Berg), 1879d:247 (*Tettigonia*). New synonymy.

vermiculata, n. sp. N. Argentina.

KEY TO SPECIES OF *VERSIGONALIA*

Pronotum with posterior margin convex; male with paraphysis conspicuous and appearing as a ventral aedeagal process
ruficauda (Walker (fig. 881)

Pronotum with posterior margin concave; male with paraphysis inconspicuous and occurring as a plate at apex of connective
vermiculata, n. sp.

Versigonalia vermiculata, NEW SPECIES

FIGURE 882

Length of male 5.8 mm, of female 6.4-6.5 mm. Head with median length of crown between one-half and six-tenths interocular width and approximately one-third transocular width. Thorax with dorsopleural carinae absent, posterior pronotal margin shallowly concave. Male pygofer with apex subangulate, posteroventral margin with a slight convexity, macrosetae restricted to apical portion (one-third, or less) of pygofer; connective broadly Y-shaped. Paraphysis occurring as a small sclerite behind apex of connective, not appearing to be a process of the aedeagus, in lateral view. Female abdominal sternum VII with posterior margin transverse and almost rectilinear; dorsal membrane of genital chamber with a sclerite on each side; second valvulae with weakly developed primary teeth in apical half. Other structural characters as in generic description.

Crown and anterior submarginal area of pronotum yellow, marked with confluent brown or black markings; scutellum yellow with sparse variable

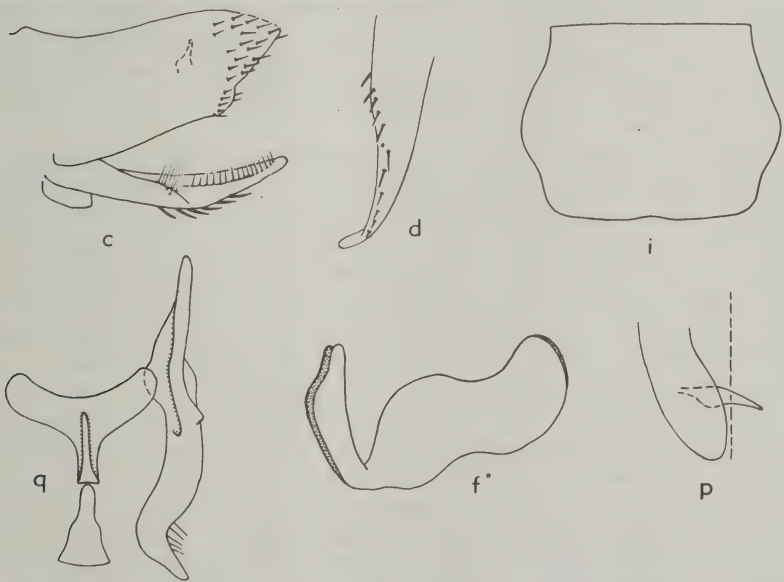


FIGURE 882.—*Versigonalia vermiculata,* n. sp., (*i* from specimen from Misiones, Argentina; remainder from holotype): *p,* Male pygofer apex, right side, from ventral view; *q,* style, connective, and paraphysis, from dorsal view.

black markings; remainder of pronotum dull to bright green with numerous vermiculate black markings; clypeus mottled tan or yellow and black, the muscle impressions all distinct, transclypeal sulcus and at least apex of clypellus black, with sparse, variable black markings on lora and genae; thoracic pleura and legs tan and with or without black markings.

Holotype male, Loreto, Misiones, Argentina, November 29, 1931 (A. A. Ogloblin); one female same data except date which is December 10, 1931 (USNM). One male and one female, "Bompland", Misiones, Argentina, January 13-14, 1927 (F. and M. Edwards) (BM).

V. vermiculata, n. sp., is most readily separable from *V. ruficauda* (Walker), by the characters used in the key.

154. Genus **BUCEPHALOGONIA** Melichar

Figure 883

Bucephalogonia Melichar, 1926a:341. Type-species: *Tettigonia xanthophis* Berg by subsequent designation of China (1938d:183).

Length of male 4.5-5.4 mm, of female 5.2-5.8 mm.

Head moderately produced, median length of crown from four-tenths to slightly more than one-half interocular width and from one-fifth to one-third transocular width, anterior margin broadly rounded in dorsal view, without a carina at transition from crown to face, ocelli located slightly before a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line, crown convex with or without a slight transverse concavity, without a median fovea and without sculpturing or setae, lateral clypeal sutures extending onto crown and attaining ocelli; antennal ledges in lateral view with anterior margins convex and oblique, not carinate dorsally; clypeus convex, muscle impressions distinct, face without pubescence, transclypeal suture not entire, clypellus not strongly produced, its contour continuing profile of clypeus.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae oblique, complete, posterior margin slightly concave, disk with or without transverse rugae, not pubescent; scutellum transversely striate or not, behind transverse sulcus. Forewing with membrane sharply delimited, including only apical cells and adjoining area along costal margin in some specimens, with entire apical one-half membranous in others, and of intermediate extent in numerous other specimens, veins distinct, not elevated, with four apical cells, the base of fourth more proximal than base of third, without an anteapical plexus of veins, texture coriaceous basally and without sculpturing; forewings of female in rest position exceeding apex of ovipositor. Hindleg in rest position with knee attaining posterior proepimeral margin, or not, femoral setal formula 2:1:0 (rarely 2:1:1), length of first tarsomere approximately equal to combined length of two more distal tarsomeres and with two parallel rows of small setae on plantar surface. Male abdomen with a pair of short strong basiventral apodemes.

Male genitalia: Pygofer moderately produced, truncate apically, with a few macrosetae on disk and near apex and a number of microsetae near and parallel to ventral margin. Plates extending farther posteriorly than pygofer

apex, each slender, triangular and with multiseriate macrosetae. Style extending farther posteriorly than apex of connective, without a preapical lobe, rounded apically. Connective T-shaped with stem very short. Aedeagus very short, curved dorsally in apical half, shaft narrowed apically or not in caudoventral view, without processes. Paraphyses absent.

Female abdominal sternum VII with a conspicuous median posterior lobe which is subacute apically (lateral lobes shown in fig 883*i* not apparent in unmacerated specimens). Dorsal membrane of genital chamber without sclerites. Ovipositor with second valvulae each bearing large primary teeth, each with a number of secondary denticles, throughout length beyond basal curvature almost to apex which is acute and with anteapical denticles on posteroventral and posterodorsal margins. Pygofer with a number of mixed macro- and microsetae on disk and a small group of posterodorsal macrosetae near margin.

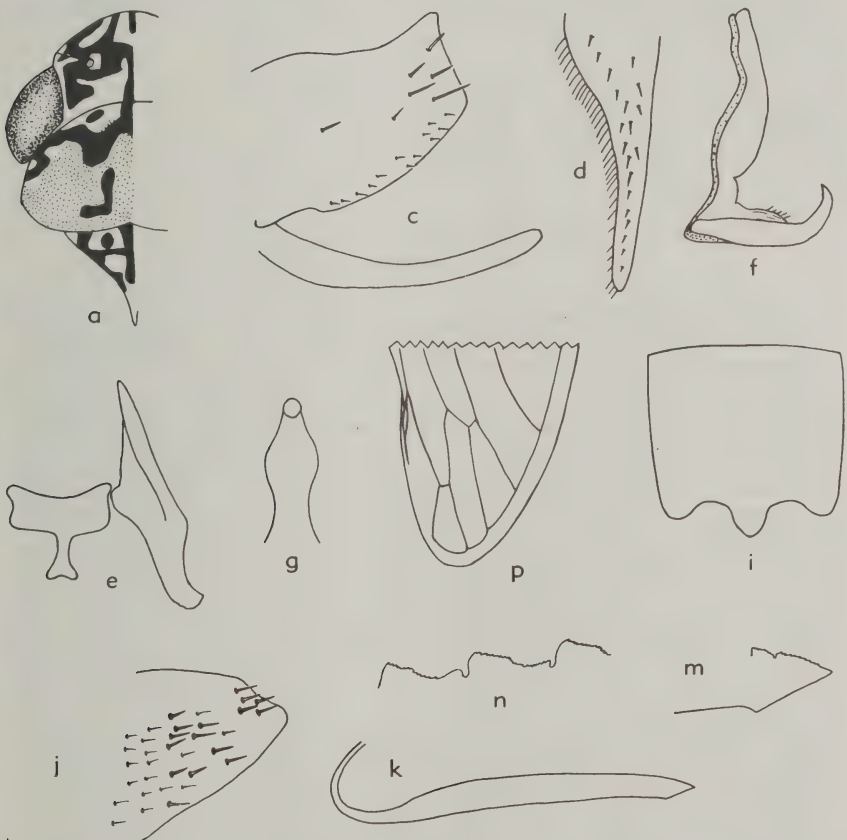


FIGURE 883.—*Bucephalogonia xanthophis* (Berg) (*a* from specimen from Rio Caraguata, Mato Grosso, Brazil; *c-g*, from Misiones, Argentina; *p* from Embarcación, Salta, Argentina; remainder from Concepción, Paraguay; only aedeagal shaft shown in *g*): *p*, Apex of hindwing.

Specimens of *Bucephalogonia* vary greatly in color. The crown varies from conspicuously marked with black to unmarked dull yellow. The pronotum and scutellum may also be entirely without black markings. The coriaceous portion of the forewings varies in extent (see description above) and in color, from green to black.

Specimens of *B. xanthophis* (Berg), the only known species, have been examined from the region from Santa Fé and Córdoba to Jujuy, Argentina northeastward to Minas Gerais, Brazil. A good series of specimens has also been examined from Santa Cruz de la Sierra, Bolivia. I have been unable to find probable relationships to other genera based on either the male or female genital structures.

One collection was from *Schinus "terebranthicus"* [*terebinthifolius* Raddi].

I know only the type-species, which is identified here on the basis of specimens compared with a specimen bearing a type label from Museo de la Plata, Argentina. Another specimen from the same collection, labeled as type of *Tettigonia guaranitica* Berg, is a synonym.

SPECIES OF *BUCEPHALOGONIA*

xanthophis (Berg), 1879d:249 (*Tettigonia*). Argentina.
guaranitica (Berg), 1884a:24 (*Tettigonia*). New synonymy.

155. Genus SERPA Distant

Figure 884

Serpa Distant, 1908a:529. Type-species: *Tettigonia plumbea* Walker, (1851b:754) by original designation and monotypy.

Length 9.9-10.4 mm.

Head not produced, anterior and posterior margins of crown parallel, median length of crown four-tenths interocular width and slightly less than one-fourth transocular width, without a carina at transition from crown to face, ocelli located behind a line between anterior eye angles, each closer to adjacent anterior eye angle than to median line of crown, crown with a shallow median concavity and a shallow concavity on each side adjoining eye, surface not or weakly sculptured and without pubescence; antennal ledges slightly protuberant, each with a horizontal keel in lateral view; clypeus strongly concave medially, muscle impressions not distinct, clypellus strongly convex in lateral view, contour of its lower portion more nearly horizontal than profile of remainder of face.

Thorax with pronotal width less than transocular width of head, lateral margins parallel, dorsopleural carinae incomplete, posterior margin shallowly concave, with a broad shallow concavity behind eye and a concavity above dorsopleural carina on each side, disk without distinct rugae; scutellum transversely striate behind transverse sulcus. Forewing with only inner apical cell membranous, veins not elevated, not distinct, with three anteapical cells of which the bases are proximal to claval apex, with a few supernumerary crossveins; forewings of female in rest position exceeding apex of ovipositor. Hindleg with femoral setal formula 2:1:1 and with some smaller setae among the

anteapical ones, length of first tarsomere approximately equal to combined length of two more distal tarsomeres and with a number of irregularly arranged small setae on plantar surface.

Male genitalia: Pygofer moderately produced posteriorly and narrowly rounded posterodorsally, with a number of macrosetae near apex and a group of elongate microsetae extending from them anteroventrally parallel to posteroventral pygofer margin; pygofer processes absent. Plates broadly

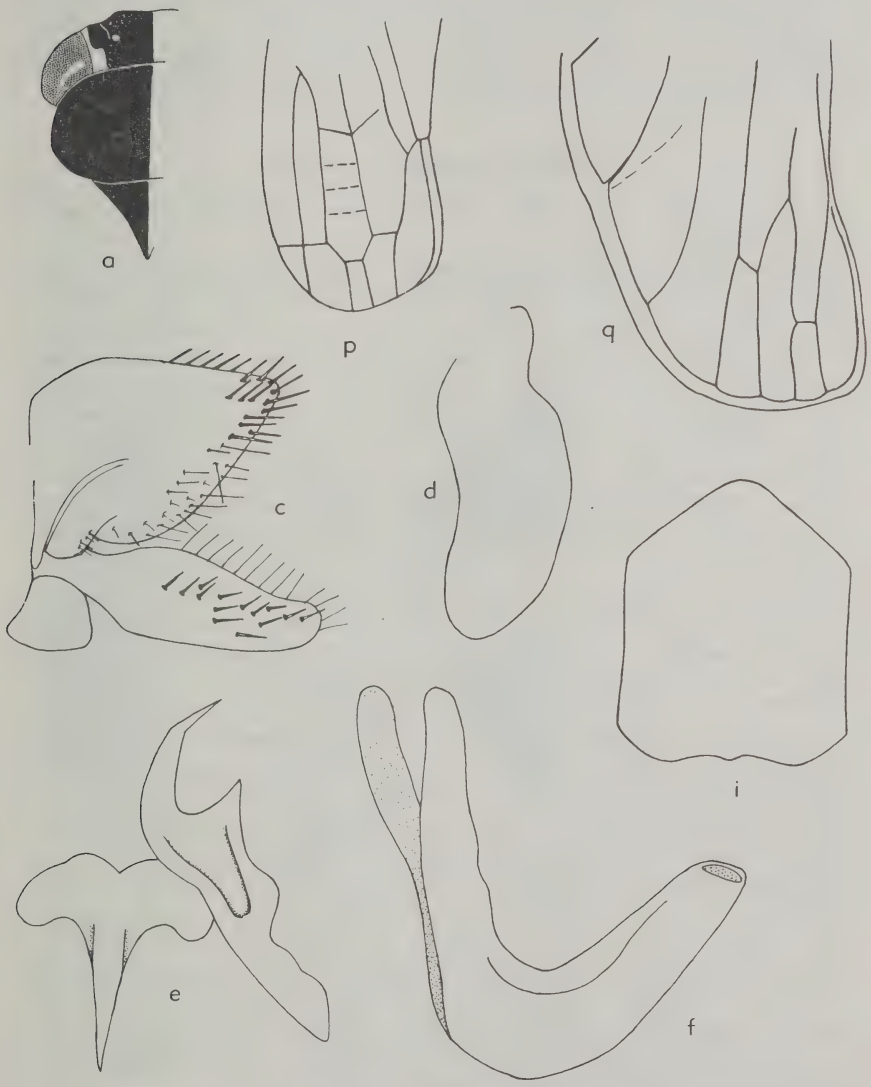


FIGURE 884.—*Serpa plumbea* (Walker) (*i, p, q,* from lectotype; remainder from specimen from Cauca, Colombia): *d,* Left plate from ventral view; *p, q,* forewing and hindwing apex, respectively, drawn *in situ.*

lobate, extending posteriorly as far as pygofer apex, each with multiseriate macrosetae and broadly convex apically. Style extending posteriorly beyond apex of connective, without a preapical lobe, apex obliquely truncate. Connective short Y-shaped; aedeagus with basal apodemes as long as shaft which extends posterodorsally; paraphyses absent.

Serpa Distant is known only from the type-species which occurs in Ecuador and Colombia. *Serpa* stands apart from other genera of Cicadellini in having strap-shaped male plates and a complete hindwing venation.

My interpretation of *Tettigonia plumbea* Walker is based on an examination of the female lectotype. I have seen a male (BM) and a female (ZIL) which were determined through comparisons with drawings of the type.

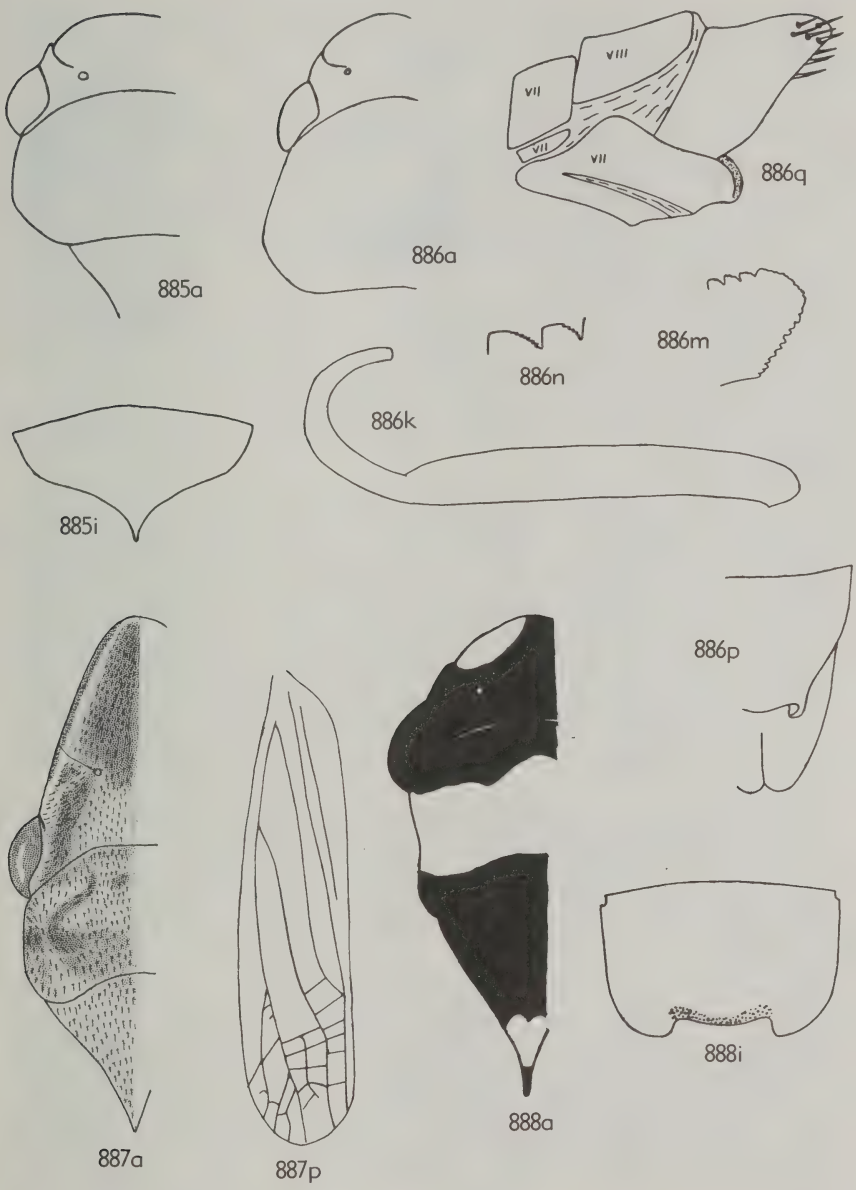
Genera of Uncertain Position

Algothyma Melichar (1926a:343), based on a nominal species that is a *nomen nudum,* is unknown to me.

Amalfia Melichar (1924a:199), type-species: *Scaris latipennis* Walker, by subsequent monotypy (Melichar, 1926a:281) is known to me only from the female holotype (fig 885) which was not at hand as this was written. My notes state that the holotype (in the BM) agrees well with the original description except that the head is not punctate. The species is about the same form and size as *Ortega truncatipennis* (Signoret), but has the forewings narrowed apically and with membranous apical cells (broad apically and with coriaceous apical cells in *truncatipennis*). The claval veins are fused for some distance at and near their midlength (disagreeing with Melichar's redescription (1926a:282)). This genus is probably in the *Neiva* generic group (p. 30).

Aspilodora Melichar (1926a:346), type-species: *Tettigoniella geminatula* Jacobi (1905c:171), by original designation and monotypy, is known to me from eight females from Marcapata, Peru. The specimens are from 16.1-16.7 mm long. Externally, the head and thorax have the appearance of an *Abana* species, in the Proconiini. In the hindlegs, the femoral setal formula is 2:1:0 and the knees at rest do not extend as far forward as the posterior proepimeral margins. The female genitalia are as follows: female abdominal sternum VII moderately produced, transverse apically with lateral apical edges rolled dorsally; with two laterosternites of which the more dorsal one is inconspicuous, the more ventral one large and conspicuous, extending caudoventrally and fused with its complement to form a continuous U-shaped ventral sternum-like plate that bears a diagonal incomplete membranous cleft on each side; ovipositor with second valvula toothed dorsally throughout the distance beyond the basal curvature, the primaries almost regularly convex and bearing minute denticles on their posterior portions, apex bluntly rounded and with convex anteapical dorsal and ventral denticles; pygofer with very few apical macrosetae. Fortunately, the females are distinctive, and will be readily recognized, and associated males will probably aid in establishing generic relationships of *Aspilodora* in the future.

Betarmonia Melichar (1926a:342), based on a nominal species that is a *nomen nudum,* is unknown to me.



FIGURES 885-888.—885, *Amalfia latipennis* (Walker), holotype (from Colombia, in BM). 886, *Aspilodora geminatula* (Jacobi) (from specimens from Marcapata, Peru; *a, p,* from HNHM; remainder from specimen from NCS): *p,* Female abdominal sternum VII, from ventral view; *q,* female abdominal apex from lateral view. 887, *Homalogoniella pubescens* (Signoret) (from specimen from unknown locality, in MMB): *p,* Forewing. 888, *Oncometopia batesi* Distant, lectotype (from Amazonas, in BM).

Chromogonia Melichar (1926a:342) is represented by two females in MMB. These were not at hand as this was written. The type-species listed by Evans (1947a:160) is a *nomen nudum*.

Derogonia Melichar (1926a:353), type-species: *Tettigonia pilipennis* Signoret (1854b:342), by subsequent designation of Evans (1947a:161), is unknown to me except from a single female specimen in the NMV. It is from Colombia and therefore not eligible to be lectotype (the type-locality is Bolivia). It is probably correctly identified, for it has the peculiar lobes of abdominal sternum VII that Signoret mentioned in the original description. It was not at hand as this was written.

The genus *Ectypus* Signoret (1853e:263) is known to me only from the original description, based on a single female of the type-species, *E. coriaceus* Signoret (1853e:265), a brachypterous specimen without ocelli, and from the colored illustration which accompanied the description. Signoret thought it might be related to *Aulacizes*, and the illustration had the appearance of a proconiine leafhopper.

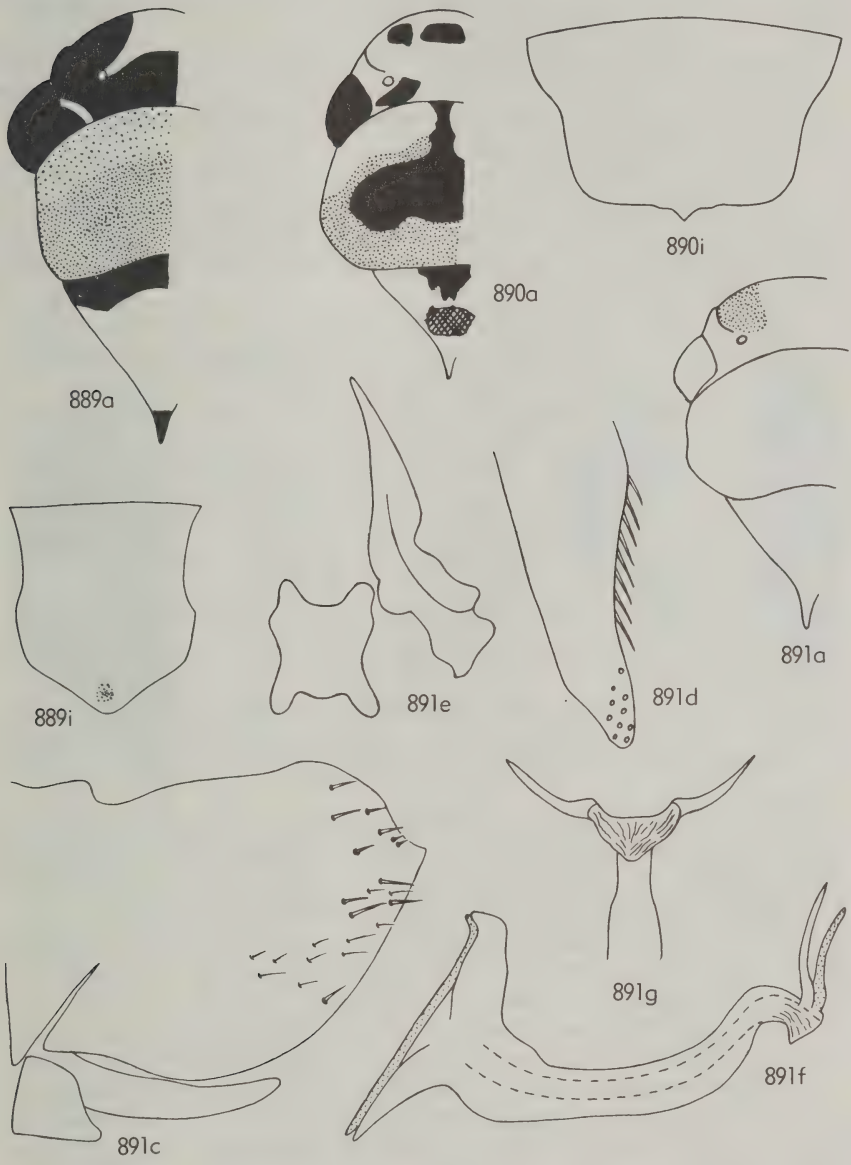
The monobasic genus *Homalogoniella* Melichar (1925a:341), type-species: *Tettigonia pubescens* Signoret (1854d:721), has been placed in the group now known as Cicadellinae by Signoret, Melichar, and Evans. I have seen one specimen without abdomen and with no locality label (fig. 887) and one female from Rio de Janeiro, both in the MMB. The lateral clypeal sutures extend onto the crown and attain the ocelli, but otherwise the specimens are more like ledrine leafhoppers than like Cicadellinae in appearance. The body is dorsoventrally flattened, the disk of the crown concave, the femoral setal formula of the hindleg is 2:0:0, there is a keel separating the crown from the face, the forewings are reticulate, and the entire dorsum is beset with black pubescence.

Metascarta Melichar (1926a:341), type-species: *Tettigonia flavipes* Signoret (1854a:22), by subsequent designation of China (1938d:183), is unknown to me. I found no specimens of *flavipes* in Signoret's collection in Vienna. There were two specimens under this name in the MMB, but they were without locality labels, and possibly *Cicadella viridis* (L.). Signoret gave Bolivia as the type-locality.

Paragonalia Evans (1947a:163) was proposed as a new name for *Paragonia* Melichar (1926a:342), preoccupied, type-species: *Tettigonia sanguinicollis* Latreille (1811a:191), by subsequent designation of China (1938d:183). Only the type-species and its synonym (fidē Signoret) *Tettigonia farinaria* Amyot and Serville (1843a:570) have been included in *Paragonalia*. I have not seen a determined specimen of either of these nominal species, nor a specimen conforming to Signoret's (1853b, pl. 12, fig. 12) illustration.

Species of Uncertain Position

Tettigella alba Metcalf (1955a:264, new name for *Tettigonia concinna* Walker, 1851b:755, preoccupied) is known to me only from the holotype in the BM with missing forewings and from an unknown locality.



FIGURES 889-891.—889, *Oncometopia brasiliensis* Distant, holotype (from Brazil, in BM). 890, *Tettigonia concinna* Perty (from specimen from Brazil, in BM). 891, *Tettigoniella hulda* Distant (from specimen from Colombia, in BM; only aedeagal apex shown in *g*).

Tettigonia aphrophoroides Fowler (1899e:250) is known to me from the lectotype female and three additional specimens, all in the BM. None of these was at hand as this was written.

Oncometopia batesi Distant (1908b:62). I have seen only the female lectotype (fig. 888) of this species in the BM. The membrane of the forewings includes all of the anteapical cells, and the clavus and corium are both reticulate-veined. The species may be proconiine.

Oncometopia brasiliensis Distant (1908b:65). I have seen only the female holotype of this species in the BM. In figure 889, the darkly shaded portion is greenish-brown, the lightly stippled portion of the pronotum is yellow mottled with castaneous and the heavily stippled area is castaneous mottled with yellow. The unshaded areas are yellow.

Tettigonia concinna Perty (1833a:180) is known to me only from a single female in BM (fig. 890) from Brazil, and one specimen without abdomen (MMB). I did not dissect the ovipositor of the specimen illustrated.

Tettigonia cosmopolita Signoret (1853b:364) is an Old World species, and will be treated in part 3. The New World records are probably in error.

Tettigonia divisa Signoret (1853b:354). I found no specimens in Signoret's collection in Vienna. There is a female in the MMB determined by Melichar, and agreeing in most respects to the original description and illustration. The specimen is from the Rio Pardo Valley in São Paulo, Brazil.

Tettigoniella hulda Distant (1908a:518). I have seen only one specimen, a male, in the BM (fig. 891). It was not selected as lectotype because it was the wrong sex. The wing apices were broken off. The specimen was not at hand as this was written.

Tettigonia innervis Fowler (1900c:274) is known to me only from the lectotype, without an abdomen, and two specimens Fowler had misdetermined as *Tettigonia rufimargo* Walker, all in the BM. None of these was at hand as this was written.

Erythrogonia integra Melichar (1926a:391) is known to me from a specimen without abdomen (MMB), a female (fig. 892) (RMS), and an additional female (SSM), all from Bolivia. The form of the second valvulae of the ovipositor is suggestive of a relationship to *Pawiloma*, new genus.

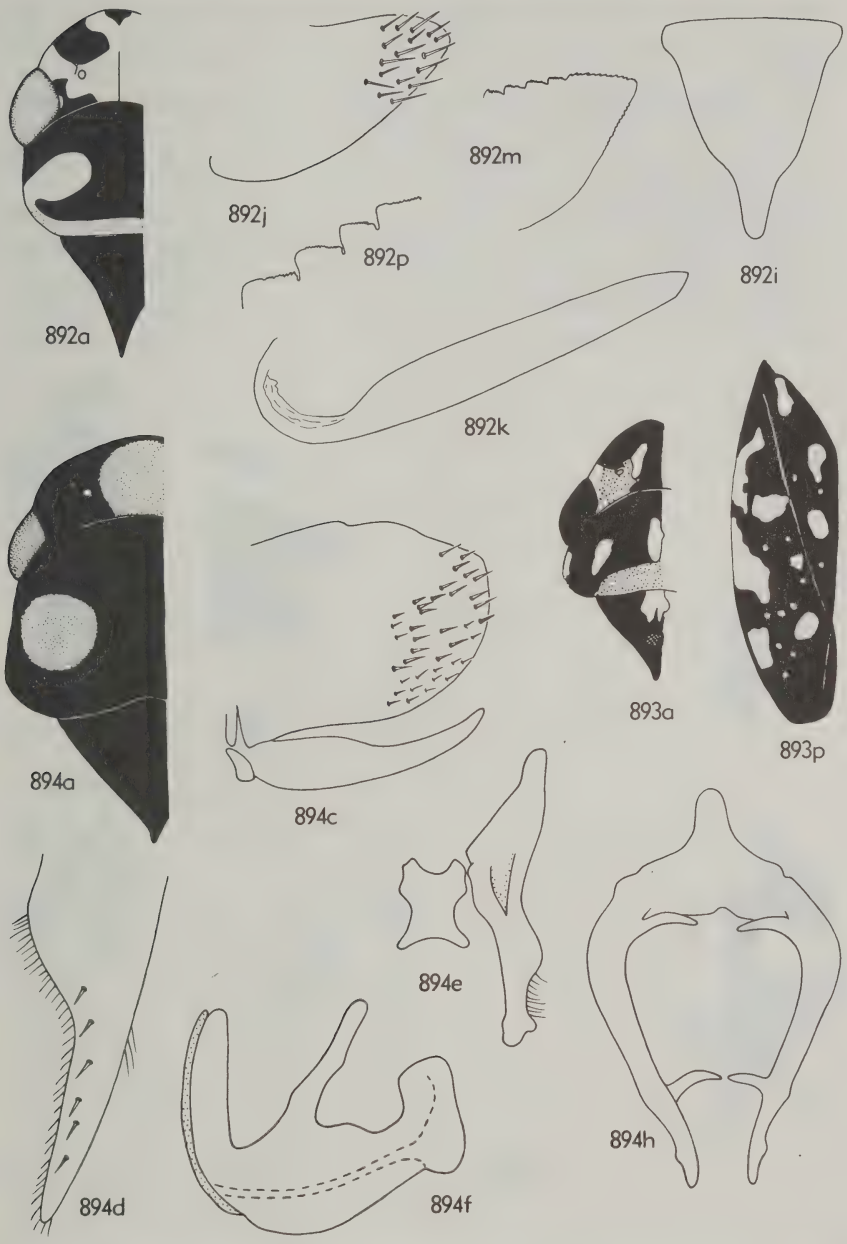
Tettigonia mactata Walker (1858b:216). I have seen only the holotype (fig. 893) of this species, a specimen without abdomen in the BM. It is robust and black with vermilion spots and a conical head.

Sphaeropogonia maculipennis Schmidt (1928c:80). I have seen only the lectotype (fig. 894) of this species, and no specimens were available as this was written.

Cardioscarta mendica Melichar (1932a:317). I have seen only the female lectotype (fig. 895) of this species in the MMB. It was not at hand when this was written or when the shading was added to the present figure of the anterior dorsum.

Cardioscarta obstinata Melichar (1932a:294) is known to me only from the female lectotype (fig. 896) in the MMB.

Tettigonia pruinina Signoret (1853b:342) is not known to me. A single specimen in the NMV from Brazil might be eligible as lectotype, if the Germar collection isn't found. It is a species belonging in *Macugonalia*, possibly



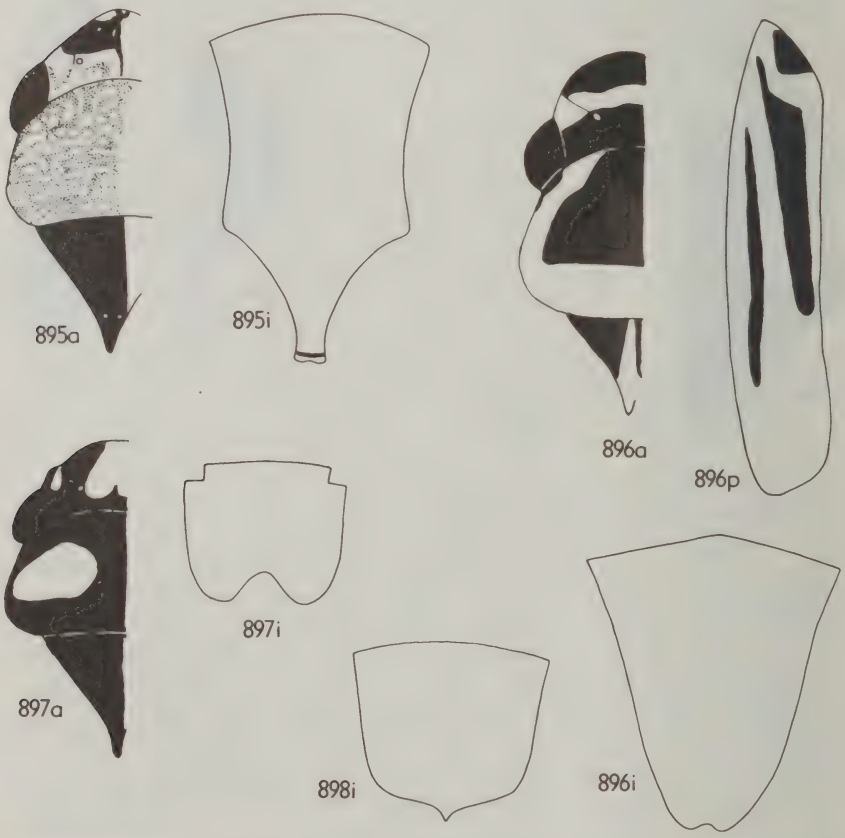
FIGURES 892-894.—892, *Erythrogonia integra* Melichar (from specimen from Cochabamba, Bolivia, in RMS): *p*, Teeth near base of toothed portion of second valvula. 893, *Tettigonia mactata* Walker, holotype (from Venezuela, in BM): *p*, Forewing. 894, *Sphaeropogonia maculipennis* Schmidt, lectotype (from Ecuador, in IZP).

tribunicia (Berg). But Signoret's original description states that the female sternum VII was slightly concave which would preclude *Macugonalia* from consideration.

Tettigonia quatuordecimpunctata Signoret (1855d:782) is known to me only from the lectotype, a teneral female from Mexico.

Tettigonia reversa Walker (1858b:215) is known to me only from the female lectotype (fig. 897) in the BM.

Tettigonia ruficaput Walker (1851b:766). The female holotype (fig. 898) of this species is in the BM, where it had been placed under *Coronigoniella marginella* (Fabricius) in the collection. The anterior dorsum of the holotype is similar to that of *C. formosula* Young, except that the lateral orange marking on each side of the pronotum is widened posteriorly. It is probably a species



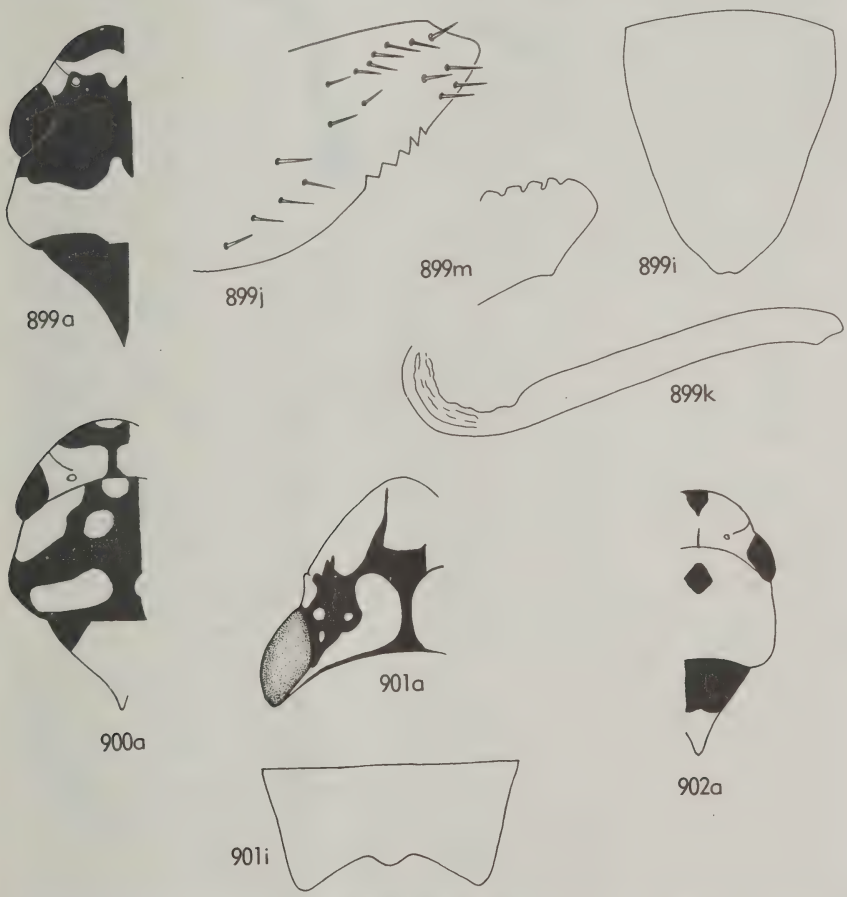
FIGURES 895-898.—895, *Cardioscarta mendica* Melichar, lectotype (from Minas Gerais, Brazil, in MMB). 896, *C. obstinata* Melichar, lectotype (from Ecuador, in MMB): *p*, Forewing outline with markings. 897, *Tettigonia reversa* Walker, holotype (from Petropolis, Brazil, in BM). 898, *Tettigonia ruficaput* Walker, holotype (from Colombia, in BM).

of *Coronigoniella* or *Coronigonalia*. It does not appear to be conspecific with *marginella*.

Erythrogonia sanguineoapicata Melichar (1926a:393) is known to me only from a slightly damaged female (fig. 899) from Marcapata, Peru (MMB). This specimen is possibly a holotype. The female genitalia belong in the *Paromenia* generic group, and are very near *Tacora*.

Tettigonia sistens Walker (1858a:95) is known to me only from the lectotype (fig. 900) in the BM, a very teneral male that is damaged by mold and has damaged wings. The paler areas of the anterior dorsum are dull orange.

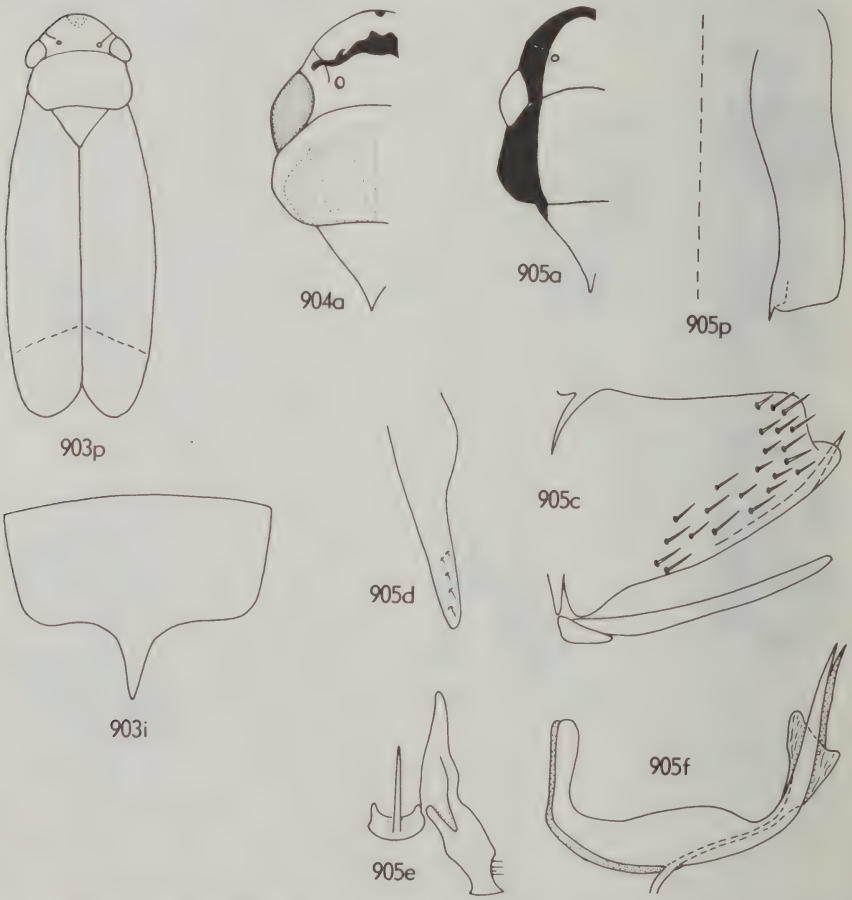
Cicada suturalis Fabricius (1794a:34) is known to me only from the lectotype, which was not at hand as this was written. The specimen is completely dull



FIGURES 899-902.—899, *Erythrogonia sanguineoapicata* Melichar (from specimen from Marcapata, Peru, in MMB; posteroventral pygofer margin damaged in *j*). 900, *Tettigonia sistens* Walker, holotype (from Montevideo, Argentina, in BM). 901, *Tettigonia undecimmaculata* Fowler, holotype (from Panama, in BM). 902, *Cardioscarta venator* Melichar, lectotype (from Peru, in MMB).

yellowish except for a pair of dark spots on each lateral margin of the scutellum (the disk of the scutellum was obscured by a pin-hole) and dark commissural margins of the forewings. The dark spots on the head, mentioned in the original description (and which caused Signoret to doubt that it belonged to his *"Tettigonia"* which was the equivalent of the Cicadellinae) are ocelli.

Tettigonia transfuga Fowler (1899d:247) is known to me only from the female lectotype, an additional female, and a teneral male, all in the BM. It is probably correctly placed in the *Graphocephala* generic group instead of in the *Oragua* generic group.



FIGURES 903-905.—903, *Tettigonia verticalis* Signoret, lectotype (from specimen from Colombia, in NMV): *p*, Dorsal view (see text; broken lines are limits of membranous wing apices). 904, *Tettigonia virgaticeps* Fowler (from specimen from Teapa, Tabasco, in BM). 905, *Tettigonia xanthonota* Signoret (from specimen from Rio de Janeiro, Brazil, in MMB).

Tettigonia undecimmaculata Fowler (1899e:254). I have seen only the female holotype (fig. 901) of this species, a female in the BM. It is possibly correctly placed in *Platygonia* as Melichar decided (1925a:34).

Cardioscarta venator Melichar (1932a:307) is known to me only from the female lectotype (fig. 902) in the MMB. The specimen was damaged and has been repaired but abdominal sternum VII is badly damaged.

Tettigonia verticalis Signoret (1853b:369). I have seen only the female lectotype (fig. 903) in the NMV. The original illustration is far different from this specimen. The specimen is ferruginous except the spot at the apex of the crown, which is dull amber, and the membrane of the forewings.

Tettigonia virgaticeps Fowler (1900c:275) is known to me only from the female lectotype and another female (fig. 904) compared with it in the BM. The abdominal sternum VII of the latter, and the pygofer are close to the illustrations of these structures in *Apogonalia germana* (Fowler) (figs. 755*i*, 755*j*). The second valvulae of the ovipositor are like the illustration of *A. omani* Young (fig. 757*m*).

I found no specimen of *Tettigonia xanthonota* Signoret (1854b:350) eligible to be lectotype. A male specimen in the MMB (fig. 905) appears to be accurately determined.

I have not been able to associate specimens with any of the following Western Hemisphere nominal species of Cicadellinae:

Tettigonia adorabilis Blanchard (1840a:190)
Proconia aequabilis Walker (1858a:98)
Cardioscarta albonotata Melichar (1932a:316)
Cicadella gothica var. *atra* Barber (1921b:130)
Erythrogonia bicolor Metcalf (1949b:260)
Tettigonia bilimeki Fowler (1900a:263)
Tettigonia biscuta Signoret (1853c:684)
Tettigonia cazicula Breddin (1901d:84)
Tettigonia cinctovittata Stål (1855b:192)
Tettigonia circumducta Signoret (1854b:360)
Tettigonia coctilis Fowler (1899c:238)
Tettigonia conspersa var. *coeca* Taschenberg (1884a:452)
Tettigonia congregata Signoret (1854b:358)
Entogonia conjuncta Melichar (1926a:363)
Tettigonia elegantula Germar (1821a:67)
Tettigonia flavicauda Taschenberg (1884a:445)
Microgoniella flavoapicata Melichar (1951a:106)
Tettigonia flavopunctata Blanchard (1852a:285)
Tettigonia foveolata Signoret (1853b:347)
Tettigonia geniculata Signoret (1853b:351)
Tettigonia hilaris Stål (1864a:75)
Tettigonia immaculata Walker (1851b:740)
Tettigonia incarnata Germar (1821a:69)
Tettigonia inflatoseta Lethierry (1890a:158)
Aulacizes inquieta Melichar (1926a:204)
Jassus lineatipennis Stål (1854b:255)

Proconia lucernea Walker (1851b:785)
Tettigonia maculifrons Signoret (1855b:235)
Tettigonia marginata Palisot de Beauvois (1820a:170)
Tettigonia carminata var. *melanopyrrha* Walker (1858b:214)
Erythrogonia meridionalis Schmidt (1928a:58)
Tettigonia nigrovittata Spinola (1852a:286)
Aulacizes nitidipennis Stål (1864a:79)
Cicadella occipitula Osborn (1926b:214)
Acrocampsa olivacea Stål (1869a:67)
Ciccus perficitus Walker (1858a:100)
Tettigonia rubripennis Signoret (1854a:5)
Tettigonia rubrotaeniata Stål (1855b:192)
Tettigonia santarosae Jensen-Haarup (1922a:14)
Tettigonia semifasciata Taschenberg (1884a:439)
Tettigonia similata Signoret (1855b:236)
Teletusa tenebricosa Melichar (1925a:348)
Tettigonia tenera Fowler (1900d:289)
Proconia terminalis Walker (1851b:786)
Amblyscarta transversalis Metcalf (1955a:264, new name for *Tettigonia transversa* Signoret, 1853b:342, preoccupied)
Tettigonia trilineaticeps Signoret (1853b:338)
Tettigonia tripartita Walker (1858a:96)

Excluded from Cicadellinae

As pointed out in the introductory portion of Part 1 of this work Young (1968a:16), higher categories based on *Makilingia* Baker, *Mileewa* Distant, and *Errhomenellus* Puton, are not considered to belong in the Cicadellinae.

Young (1952a:19) erected *Hadralebra* for *Dikraneura (Hyloidea) laticeps* Osborn (1928a:277). Later, Young (1957a:132) transferred *Hadralebra* to the (Tettigellinae) = Cicadellinae. Ruppel (1959a:367) returned *Hadralebra* to the Alebrini of the Typhlocybinae after study of an additional new species of this genus.

Tahura Melichar and *Synogonia* Melichar, included in the Cicadellinae by Melichar, and by Metcalf, have been correctly placed in the Nirvaninae by Dr. James P. Kramer (Proc. Ent. Soc. Wash. 78:38.1976).

Clydacha Melichar and *Phereurhinus* Jacobi have also been treated by Dr. Kramer (Proc. Ent. Soc. Wash. 78:117-131. 1976), in another subfamily.

Tettigonia bicolor Fowler (1900d:289). The holotype of this species is a specimen of *Scaphoidula* Osborn, in the Deltocephalinae.

Cicadella clitellaria Osborn is a deltocephaline species.

Tettigonia metallescens Walker is represented by a single specimen standing under the genus *Coelidia* Germar (W. J. Knight, personal comunication) in the BM.

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